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ANESTHESIOLOGY NUMBER

Number 2 212 East Ohio St., Chicago 11, Ill. October, 1952

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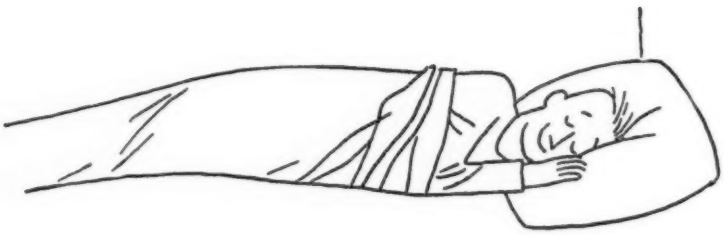

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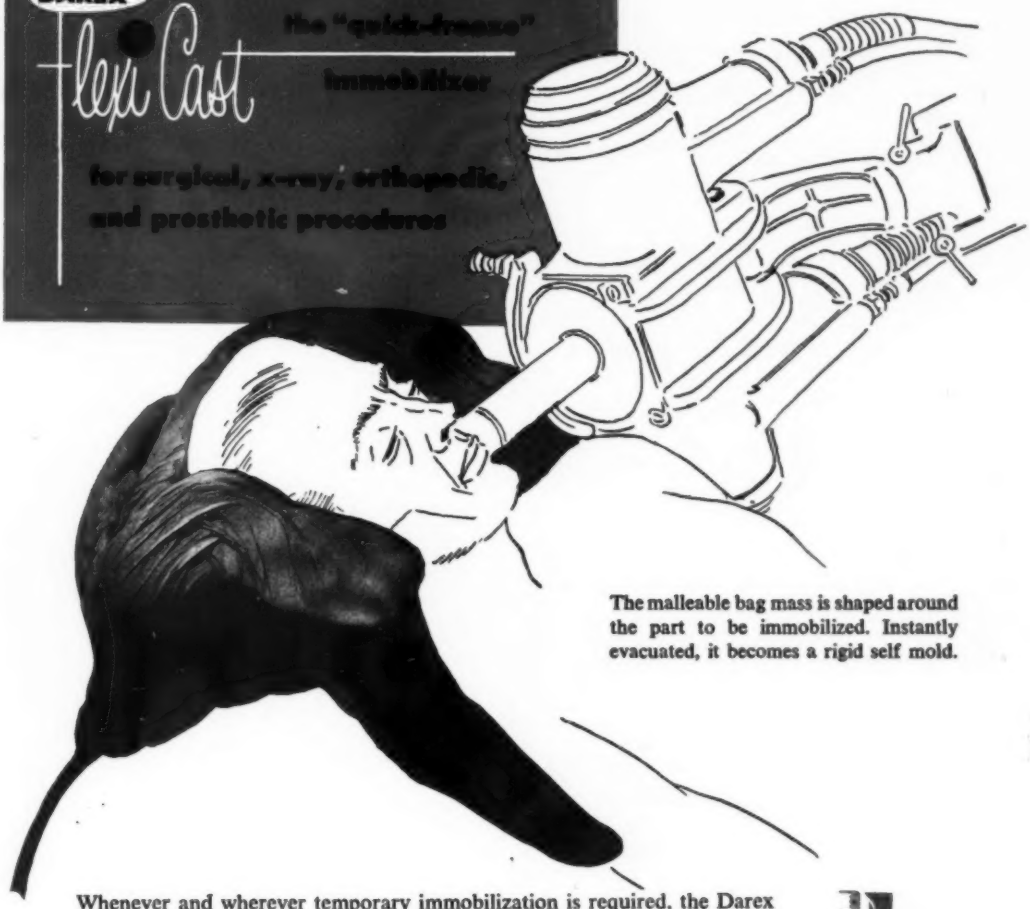

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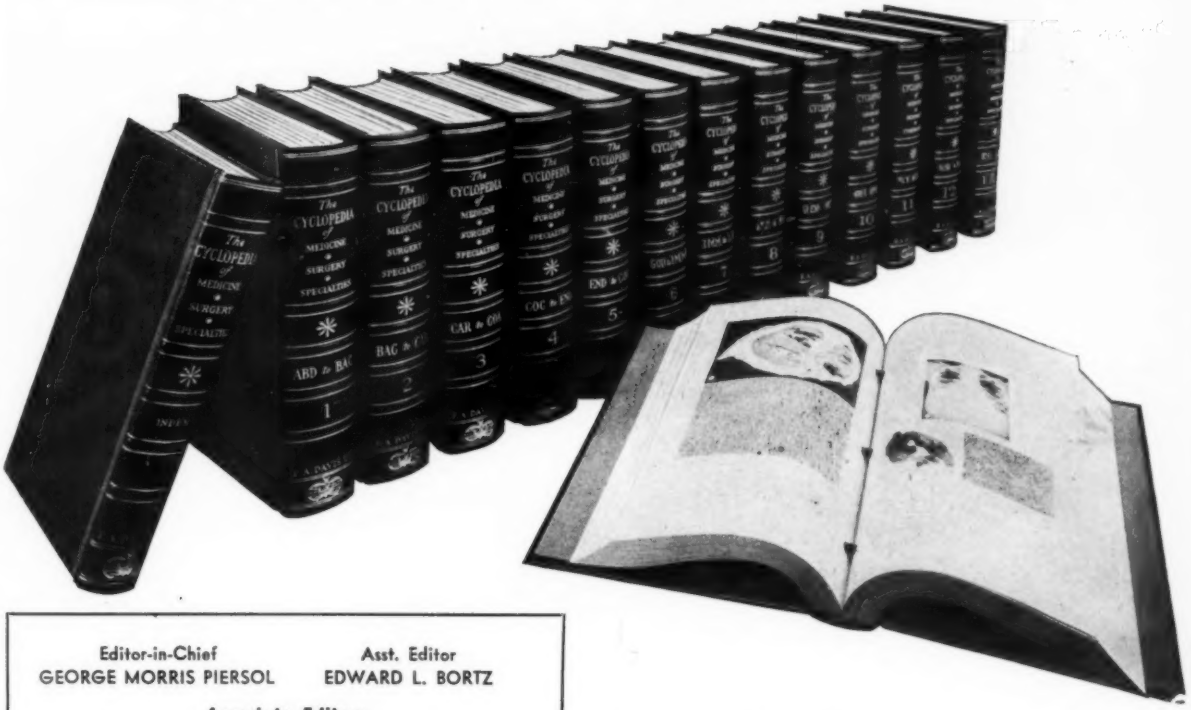

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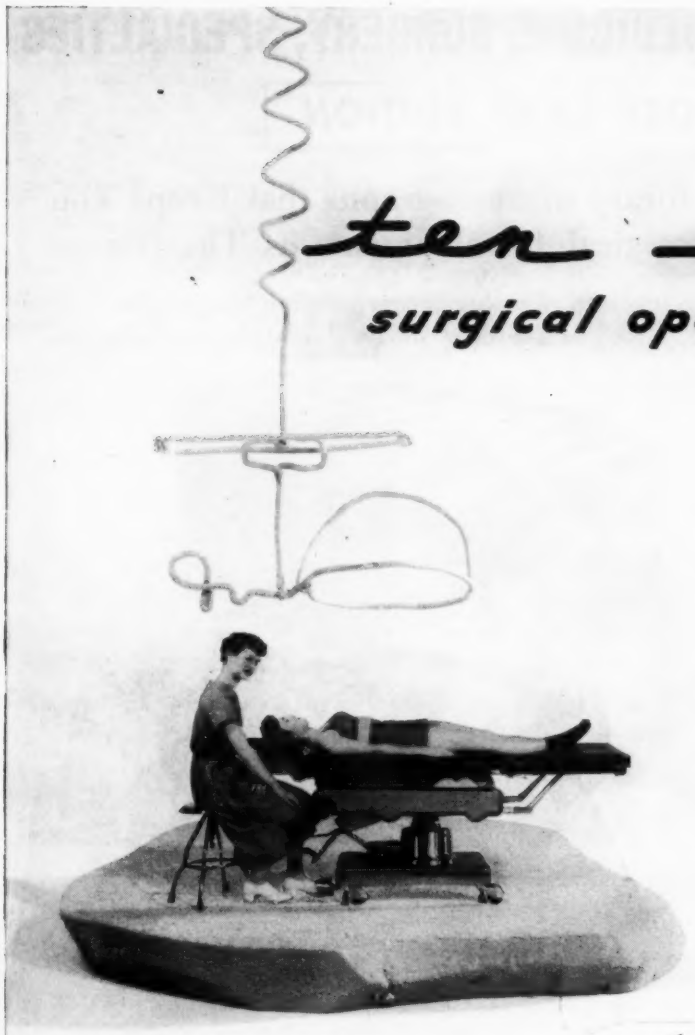

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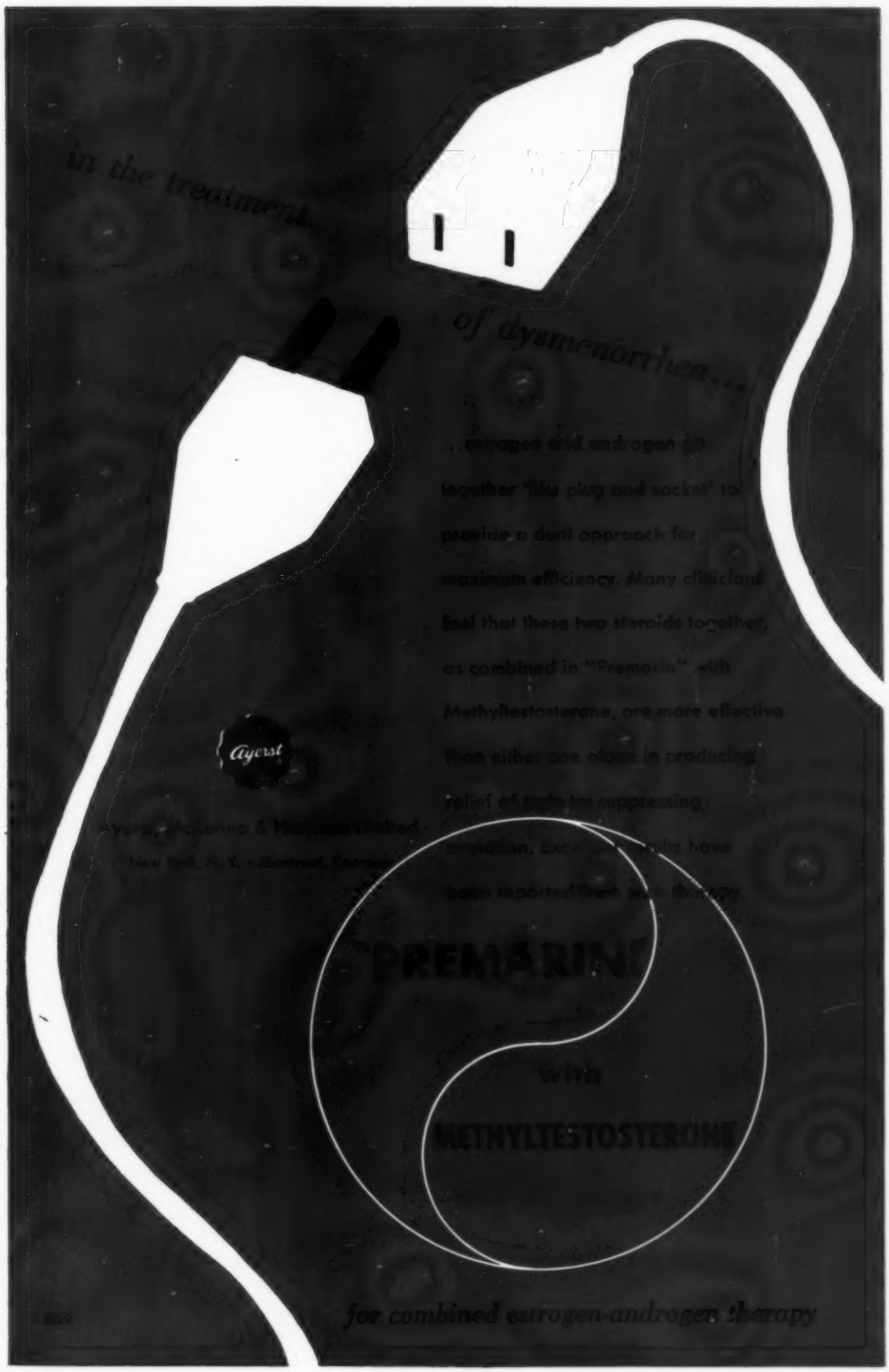
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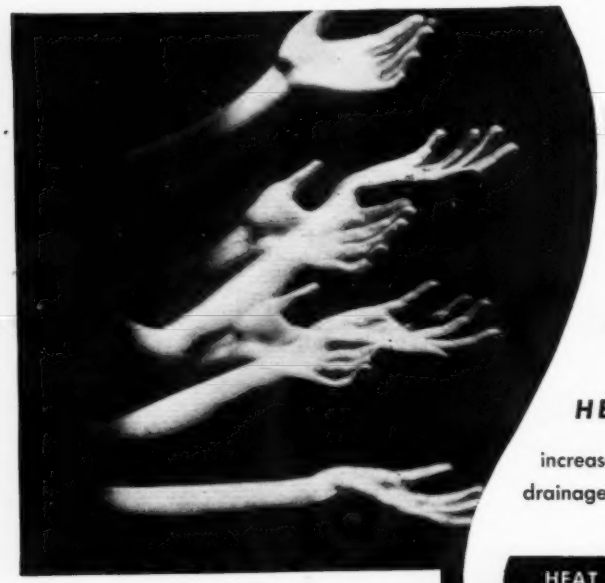

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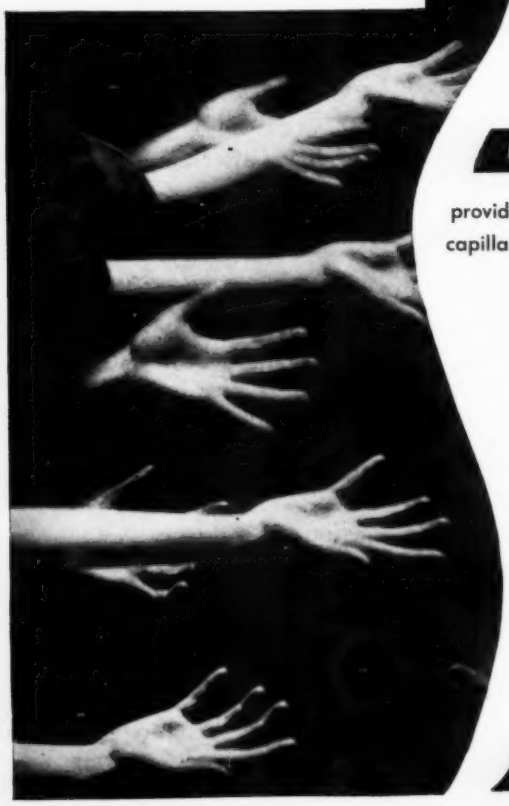

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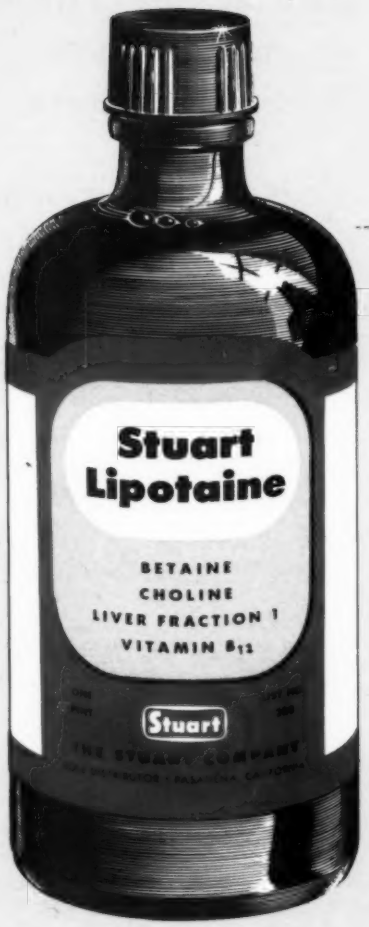

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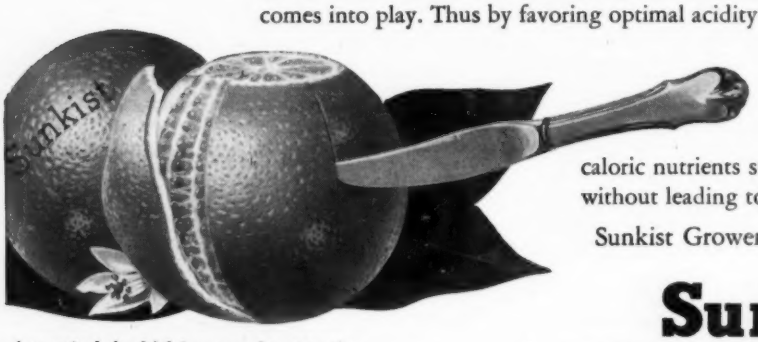

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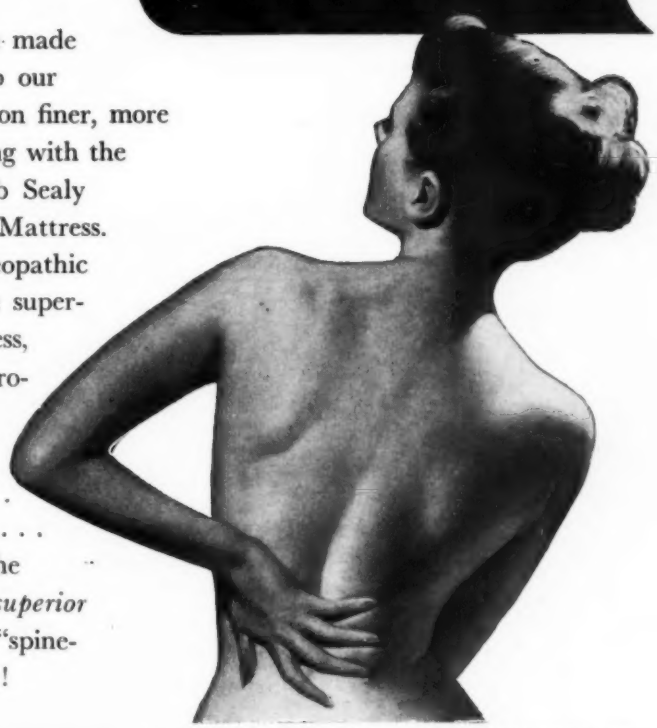

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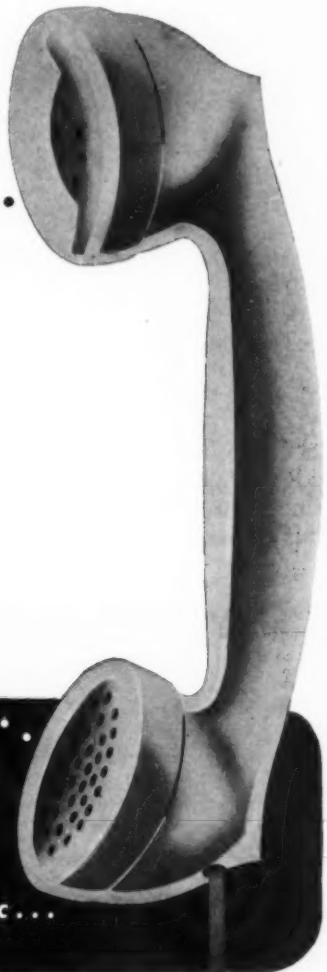

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1. Bradley, J. E., et al.: J. Pediat. 38:41, 1951; Idem: Amer. Acad. Pediat., meeting Oct. 16, 1951.

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In 1948, less than half of the States in the United States had mental health programs to meet the needs of the emotionally or mentally maladjusted, and to maintain mental health.

In 1951, all States had such programs and were spending almost $2 to every $1 contributed by the Federal Government. This ratio was $1 to $1 in 1948. In 1951, Public Health Service grants to the States of $3.5 million were almost doubled by State and local funds totaling $7,296,000. These funds—almost $11,000,000 plus $1,000,000 of private funds—were spent for community clinic services, and for educational and consultant services. These control efforts, which, on the basis of present psychological and psychiatric knowledge, frequently succeed in preventing adjustment difficulties from becoming serious mental health problems, are being constantly expanded. A suggested State draft act which the Institute prepared in the fall of 1950 has become the basis for revisions made by a number of State legislatures in their laws governing mental health. In addition, at the request of State governors, the Mental Health Institute has provided consultative services to 23 psychiatric hospitals and institutions in Illinois, Colorado, and South Dakota. Their recommendations have been utilized for the improved hospital care of the mentally disturbed.

The National Institute of Mental Health also maintained close cooperative working relationship with the States on two growing national problems—alcoholism and drug addiction. Through special grants made by the Institute, the services of qualified organizations were used to secure further knowledge about the social and psychological conditions conducive to drug addiction among minors. In June 1951, a conference of several constituent units of the Federal Security Agency was sponsored by the National Institute of Mental Health to survey current knowledge of the problem and to plan a coordinated program of action.

In cooperation with State and local agencies, the problem of alcoholism was surveyed throughout the country as a preliminary step toward developing a program for its control. A special project grant was made to the Yale Center of Alcohol Studies to support a comprehensive survey of existing research on the problem of alcoholism and methods of education and treatment to combat it.

MENTAL HEALTH PERSONNEL

To develop the training of specialized personnel in all areas of mental health—now inadequate to meet the need—the Mental Health Institute has been able to provide 186 training grants to various non-Federal universities and institutions to promote the expansion of graduate teaching programs in psychiatry, clinical psychology, psychiatric social work, psychiatric nursing, public mental hygiene, and neurology.

Grants were awarded to 42 medical schools to provide undergraduate psychiatric education. Other grants were made to finance five institutes for public health officers, nurses, psychologists, and psychiatrists in public health mental hygiene, and a conference on undergraduate psychiatric education sponsored by the American Psychiatric Association.

RESEARCH ACTIVITIES

While the full development of the Public Health Service's program of research in mental health awaits the completion of the Clinical Center with its laboratory facilities, plans for its expansion are now being crystallized. The recent appointment of Dr. Seymour S. Kety as scientific director for both the Mental Health Institute and the National Institute of Neurological Diseases and Blindness emphasizes a research approach which will explore both the organic and functional bases of mental and neurological disorders.

Cooperative research projects were conducted with other institutions. At the Worcester Foundation for Experimental

*Reprinted from "Annual Report of Federal Security Agency, Public Health Service, 1951."

Biology, for example, scientists of the Foundation and scientists from the Mental Health Institute studied the output of adrenal cortical hormones in normal groups and in groups of schizophrenic patients in an attempt to assess the role of the adrenal cortex in mental disorders.

DRUG ADDICTION

Research on barbiturate and drug addiction at the Addiction Research Center of the Public Health Service Hospital at Lexington, Ky., continued to yield significant results. Study was continued on the development of synthetic analgesics as substitutes for morphine. Battlefield experience in Korea confirmed the value of methadon as a valuable analgesic which could be given by mouth. The development of methadon frees the United States from dependence on imports of foreign opium—from which morphine is derived—a matter of considerable importance in event of total war. Experimentation at Lexington, Ky., also demonstrated that withdrawal effects following barbiturate addiction included epileptic-like convulsions and psychoses.

RESEARCH GRANTS PROGRAM

Under the Mental Health Research Grants program, several other important findings have been made in the past year. One of the studies in psychosomatic medicine has revealed a significant correlation between personality characteristics and the rates of pepsinogen secretion in patients suffering from duodenal and peptic ulcer and from pernicious anemia. Another project has revealed important facts relative to behavioral contagion among groups of emotionally disturbed children, and the data are being used to develop new techniques of childhood social adjustment.

NEUROLOGICAL DISEASES AND BLINDNESS

The National Institute of Neurological Diseases and Blindness, established in the summer of 1950, has already initiated its program of medical research grants and a program of fellowships and traineeships to support the training of qualified personnel for fundamental research and investigation of more effective methods for treatment and rehabilitation in the crippling neurological diseases.

GRANTS FOR TEACHING AND RESEARCH

Because no funds were available for the operation of the new institute during fiscal year 1951, grants in neurological diseases and blindness were made and administered through the National Institute of Mental Health and its Advisory Council. Fifty research grants were made in the amount of $490,000 for studies in neurophysiology, neuropathology, neuroanatomy, and specific problems concerning diseases of the eye. In addition, the Research Grants Division, through the National Advisory Health Council, which recommends grants for general medical research, supported projects in these areas in the amount of $350,000.

To support the teaching of neurology—a field which is short of both clinicians and investigators—the National Institute of Mental Health made $77,881 available for teaching grants. Many of these research and teaching projects will be assumed by the new Institute in 1952. They represent a well-rounded attack on many specific problems such as cerebral palsy, epilepsy, multiple sclerosis, glaucoma, and cataracts, as well as many basic problems about the brain, spinal cord, and neuromuscular systems which are fundamental to an understanding of the causes of these as yet incurable disorders.

The National Institute of Neurological Diseases and Blindness in fiscal year 1952 will have $1,015,000 available for grants in medical research and $51,400 to award for fellowships. These funds will aid promising students at various universities and institutions who are seeking their masters' degrees or doctorates in neurology and ophthalmology, or who are doing postdoctorate work in these fields. Another $36,000 will be available for support of traineeships for qualified physicians, professional personnel, and others seeking specialized training in neurological rehabilitation.

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Principles of Vertebral Manipulation in the Cervical Area*

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INTRODUCTION

"The neck . . . is more subject to injury than any other part of the body." Clark[1] proceeds to list etiologic factors of cervical lesions including the effects of childbirth, dental extractions, occupations, sudden turns, and improper treatment. Throughout life there are repeated direct or primary traumas, strains, and congestion effective at this area. In addition, as a result of compound effects of altered muscle pull and body balance, this area, so far from the weight-bearing base, is constantly suffering from the effects of postural strains.

Postural strain begins with the elevation of the baby's head and is further complicated when the infant attempts the erect position. Alterations at the sacral base or in the lumbar segments are responsible for the marked compensatory effects in the dorsal area, but these effects are far from restricted to the dorsal area. The tendency for rotational strain to occur at the transitional vertebral levels in all areas as part of a compensatory mechanism has been emphasized by Dunnington.[2] McWilliams[3] has suggested a pattern of lesions falling in lumbar, dorsal, and cervical areas. Pratt[4] mentions the preponderance of a correlation between the position of the atlas and the fifth lumbar vertebra. Proper treatment of the *cervical area* includes consideration of all such underlying factors with proper treatment at all levels.

Not only are there articular and periarticular changes responding to gravitational pulls, but the widespread effects of altered muscle activity of certain special groups and individual muscles will be reflected in the cervical areas. Such factors would include changes within the trapezius with its extensive attachments from skull to shoulder to dorsal spine; the scalene muscles with effects of respiration, shoulder motion, et cetera; the effects of the latissimus dorsi on shoulder mechanics; effects of changes in the rhomboidei and levatores scapulae; the less emphasized but powerful leverage of the abdominal muscles and intercostals acting on the long levers of the ribs to distort the thoracic cage and again alter the structural basis of the cervical column.[5] Incidentally, a consideration of the areas of innervation of the affected muscles will be perhaps far more important than consideration of the gross changes in the muscles since muscles behave largely as they are instructed by the nervous system.

Manipulative procedures directed to the dorsal areas frequently relieve effects which might be considered due more to reflexes than actual muscle relations. Judovich and Bates[6] describe segmental neuralgias related to the brachial plexus associated with pressure points of tenderness from the fifth cervical to the second dorsal. They state that nerve irritation at the first and second dorsals may produce pain symptoms through the cervical area as high as the axis, along with more typical symptoms of brachial plexus involvement.[7] Korr[8] and his coworkers have shown that stimulation at nearby areas will set off increased reactions at the level of the "facilitated" segment and this behavior might be demonstrated in the cervicodorsal area.

We consider this evaluation of related areas, the entire structural evaluation of the patient plus proper history, physical examination, and laboratory evaluations—all proper principles of cervical management to the end that we may know the patient and his condition.

TYPES OF CERVICAL MANIPULATION

Types of manipulation will vary somewhat according to the areas and structures to be treated, and thus we might classify cervical manipulation according to vertebral levels, or cervical areas such as posterior, lateral, anterior, suprahyoid, et cetera. The manner of manipulation would include: (1) soft-tissue manipulation with its subdivisions of superficial and deep lymphatic drainage and venous drainage, muscle relaxation, and other possible effects of reflex stimulation; (2) geriatric or "springing" type of ligamentous and joint manipulation or passive motion; and, finally, (3) active normalization or "thrust" technic.

This reiteration of an obvious classification is to suggest that each type of manipulation has a definite application. The treatment of the individual must be based on an evaluation of the location and nature of the lesion processes with particular attention to the components of the lesion process as well as consideration of all the physiologic processes and the peculiarities of the patient, inasmuch as there are differences

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of degree and of speed within such a classification.[9]

Long and Lloyd[10] have emphasized the contrasting points of view concerning the nature of the articular lesion: that depending on altered position of individual segments and that which is more concerned with the mechanics of an area. There is an interdependence of bony position, ligamentous change, synovial irritation, muscular pull, and soft tissue congestion and fascial tension—and yet the clinical predominance of one or another component should help in determining the type of treatment. The primary or traumatic osseous or articular lesion almost invariably involves strain of the capsular elements, and therefore means a movement beyond the normal range of motion. Burns'[11] description of the production of the experimental lesion includes a "slight sudden additional pressure" when the joint is at its physiological limit of motion. When postural strain or temperature changes or fatigue have produced altered muscular and fascial strains, it is conceivable that the limitation of motion under these circumstances would be *within* the physiological range. McConnell and Teall[12] verify this as a distinction of the muscular lesion. The exception to this distinction would be an impaction or "jamming" of the articular surfaces with or without appreciable motion in the planes of the facets.

These different considerations of types of lesions or possibly components of the lesion process should affect our management of individual cases. The stages of the lesion pathology should similarly determine individual management. Utilization of Burns'[13] analysis of these stages in animals can be applied in the treatment of human lesioning. When hyperemia and edema are predominant, the treatment should include lymphatic and venous drainage and an easy positioning of the structures, maintaining such positioning so as to gap articular structures with pillows, a rolled towel, or sandbags. When muscle contraction is present (especially of the long muscles masking the immediate area of involvement), some muscle relaxation is indicated, along with continued drainage and relief of articular tension. When ischemia occurs and edema is absent, when muscle contraction gives way to contracture or atrophy, and muscle tension is replaced by scar tissue contraction, fibrosis, and adhesions, then the indications are particularly for springing and thrust technics.

DRAINAGE IN THE CERVICAL AREA

The principles of lymphatic and venous drainage lie in any maneuvers that will increase movement in the efferent lymph channels, and the return of venous blood from the cervical and cephalic areas. An often forgotten venous channel is the plexus of veins associated with the vertebral artery. The cervical lymphatics return by the right and left jugular trunks, the left joining the thoracic duct before its entry at the junction of the left internal jugular and subclavian veins, the right trunk forming a tributary of the right lymphatic duct which enters the subclavian vein at or near its junction with the right internal jugular vein.[14] The thoracic or Miller lymphatic pump will increase cervical lymphatic drainage. Superficial lymphatic drainage will be over the entire area in a caudad direction; deep lymphatic drainage will follow the muscles and fascia downward, recalling the specializations of the cervical fascia investing the large muscles, the trachea, the carotid sheath, et cetera, and the continuous relationship between thoracic and mediastinal areas and upper cervical and structures of the norma basalis as Cathie[15] has indicated. The pressure should be light and intermittent, rather *instituting* a physiologic change in the tissues than *completing* a milking process.

The suboccipital triangle is a particularly important area for soft tissue attention because of the relations of the cervical plexus, the vertebral artery, veins, and sympathetic plexus, and inasmuch as the posterior atlanto-occipital membrane, which forms part of the floor of the suboccipital triangle in relation to the rectus capitis posterior minor posteriorly, forms an attachment for the dura mater anteriorly.[16]

Another important area for soft-tissue consideration, emphasized by Magoun,[17] is at and beneath the angle of the jaw, in which are affected not only the temperomandibular joint and potentially the auditory structures, but also the suprahyoid musculature, the lymphatic and salivary glands of the area, and the important relations of the hypoglossal, vagus, and glossopharyngeal nerves.

MUSCLE NORMALIZATION IN THE CERVICAL AREA

I agree with Hulett[18] that the removal of the cause is the fundamental measure in the relief of muscle contraction. In the early stages of the acute lesion, not only is muscle contraction poorly organized, but manipulation which will increase the hyperemia will increase the damage (hence the important differentiation of drainage from muscle relaxation). Careful positioning and relief of articular strain and relief of chronic lesions underlying acute strain or acute congestion will often effect rapid muscle normalization. Nevertheless, it is also recognized that clinically it is possible to produce muscle relaxation by deep pressure. Perhaps the most important indication for this is in the splinting action (often partly voluntary) of the long muscles of the superficial layers and hence in areas *related* to the lesioned area rather than directly over inflamed surfaces. Hoover and Nelson[19] have reiterated Burns' warning of damage produced by pressure over inflamed areas.

The mechanics of deep pressure relaxation has been suggested as the fatigue of the synapses concerned in the somaticosomatic reflexes, fatigue achieved by the continuous stream of impulses from pressure at right angles to the muscle belly or at either point of attachment, or due to the final stimulus of receptors of higher threshold capable of producing a central inhibitory state (CIS). It is important to recognize that nerve impulses are measured in sigmas, or thousandths of a second, so that "prolonged pressure" should probably be measured in fractions of a second or seconds rather than in minutes or quarter-hour periods.[20]

The attachments of muscle and the relations of fascia in an area require a thought-out application of technics rather than a stereotyped manipulation.[21] Some of the most important soft-tissue work in the cervical area may be in the relaxation of shoulder muscles and upper dorsal areas because of the important relations already mentioned, and because of the possibility of such disturbances covering and masking the levels of cervical injury.

A few cautions are given for the benefit of students: avoidance of carotid sinus pressure or excessive vagal or phrenic nerve stimulation unless such measures are specifically indicated; avoidance of persistent rhythmic motions, especially oscillation at the atlantoaxial joint which can produce dizziness or nausea in susceptible individuals; care in the use of

traction which I have chosen to mention in connection with articular or "corrective" procedures; and finally, avoidance of exhaustion of the patient. The shortness of continuous stimulation required for synaptic fatigue has been suggested. Thomas[22] has aptly stated that we should remember that we are starting physiologic processes that will produce effects in their own time. Our overanxiousness to cure may lead us to overtreat.

CORRECTIVE PROCEDURES

Although any procedure tending to produce normalization of structure or function is "corrective," we have come to understand by this term any induced movements such as a springing, "geriatric" type of motion and "thrust" movements or active mobilization. Induced movement of either of these types *has been responsible for some of the most dramatic effects of osteopathic manipulative care;* but also, particularly in the cervical area, it has been responsible for some of the greatest controversy and clinical complaints.

Correction implies accurate diagnosis of the condition to be corrected; the chance results achieved by "general" or nonspecific mobilization are not worthy of endorsement by our profession. This is not to condemn careful "range-of-motion" technics or articulatory technics, but rather indiscriminate thrusts, regardless of their acoustical effects.

Korr[23] has recently emphasized the difficulty of standardizing palpatory findings and manipulative treatment, and there has been demonstrated a very poor correlation between x-ray and palpatory findings.[24] Perhaps a higher correlation will be achieved as a result of the emphasis of the Academy of Applied Osteopathy and its individual members toward more accurate and specific diagnosis. Fryette's[25] hypotheses concerning vertebral motion has led to recent recapitulations by Nelson, Hoover, and Pratt.[26,27,28] As applied to the cervical area I would interpret Fryette's hypotheses to mean that if the cervical column is in easy normal position before sidebending occurs, there is complementary rotation toward the convexity of the curve thus produced, but if the column is in full backward or forward bending, in order for sidebending to occur, it must be preceded by rotation toward that same side. The principle of correction then, I interpret, is to reverse the pattern of production of the altered position which of course depends upon accurate diagnosis of the lesion. This is the chief merit of the approach, lending re-emphasis to the idea of a specific motion applied for a specific purpose.

There is considerable study yet required in order to see the correlation of all parts of this material in the cervical area. The position of the cervical facets is such as to suggest that in gliding motion particularly and probably also in "rocking" motion, sidebending and rotation always occur in complementary fashion. Downing[29] states, "Rotation and sidebending are inseparable, due to the oblique inclination of the articulating facets." Such combination of movement would be of necessity toward the same side or rotation to the concavity; this would conform to Fryette's second hypothesis, but I feel that it could occur in the *cervical area* from any position in the saggital plane of motion. Rotation of individual facets to the opposite side of their sidebending would only appear possible with extreme gaping of the opposite facets. And I further suspect that much sidewise motion of the bodies, such as occurs in lumbar rotation, tends to be inhibited by the saddle-like superior surfaces of the cervical bodies.

The facets are *not* designed for easy generalization about axes of rotation or oscillation. Guy[30] finds the center of oscillation posterior to the spinous processes with the center of the arc of the facet facings located posteriorly. This is true of the upper segments (second to fifth) but the transition of the planes of the superior facets from backward upward and medially to backward upward and laterally is not always confined to the seventh cervical or first dorsal; the transition may begin as high as the fifth or fourth cervical.

The potential complexities of cervical motion would seem to present impossible tasks in diagnosis. But the familiarity of the physician with normal motion and his use of careful comparison of sides with the all-important evaluation of the "tissue feel," do give sufficient empirical evidence for successful therapeutic manipulation. Theoretical considerations may lead us to ignore important empirical considerations. Downing[31] gives an excellent classification of eleven types of lesions of the occiput on the atlas. But empirically, the occiput is most often found in a lesioned state in the position of backward bending, especially on one affected side; occasionally such lesioning is associated with a slight downward, medial, or side nodding position. If this position is most common, it may be because the traumatic etiology is often that of slanting blows to the vertex or side of the skull, or sudden or prolonged backward bending of the head or, if due to muscle congestion and contraction, the leverage of the short but strong suboccipital muscles.

Empirically again, in a postural type of strain, the atlas may be rotated toward one side and the occipital strain may be on the other side, whereas in trauma from above, some of the force will be disseminated into atlas rotation, producing lesions of both segments particularly involving the same side. The peculiar adaptations of the two upper cervical vertebrae help to protect the skull from strain from below; thus a sidebending-rotation strain from below is blocked at the atlantoaxial rather than the occipitoatlantal articulation. The essentially important restriction in atlantoaxial motion is in rotation which, representing the greatest proportion of rotation in the cervical area, can usually be easily diagnosed by a test for motion.

The tendency to classify all osseous lesions as restrictions *within* the normal range of motion has been based on failure to differentiate types of strains, and possibly failure to differentiate pathologic from normal physiologic motion. Ellis'[32] demonstration of articular fissures in various movements brings us back to the realization that normal motion may consist entirely in a rocking motion with approximation at one end of the fissure and separation at the other rather than gross sliding movement. An exception to the idea that the osseous lesion is an excess of normal motion, that is, the jamming or impaction type of strain, has already been mentioned. And it is certainly in this type of injury that the greatest effects are due to the injury of the synovial membranes rather than to the capsule, except as the capsule and other contiguous structures become involved by the local pathology. We believe that some injury of this sort with or without the additional capsular strain is part of the acute traumatic injury which should probably deserve its own classification as an acute traumatic synovitis of the vertebral joint. We would not expect the same gross findings in this condition as in a torsion strain nor the same dramatic results of correction. The treatment of the

acute traumatic synovitis should approximate that of the first stage of the acute lesion as previously described, plus rest and any adjunctive measure which will tend to reduce local inflammation rather than increase it. The synovial membrane as a factor in clinical symptoms of back pain has been recently reiterated by Kraft and Levinthal[33] in their description of the mechanics and effects of impingement of the facets on redundant synovial tissue, which they describe as a "new concept in the etiology of lumbar vertebral derangement." They make a most interesting conclusion regarding the relationship of the articulations and the intervertebral disk:

. . . If impingement of the synovial tissue causes a local inflammatory reaction, this reaction *by a reflex mechanism* may also involve the contiguous structures and particularly the posterior annulus fibrosus. In the presence of inflammation these structures become weaker until the posterior annulus fibrosus gives way completely and herniation of the degenerated disc occurs. The posterior annulus fibrosus covered by the thin expanded portion of the posterior longitudinal ligament is the weakest area and it lies in reasonably close proximity to the articulations. (Italics supplied.)

This repetition of material concerning acute lesions may have some bearing on the analysis of different principles of correction:

We are indebted to Beckwith[34] for an excellent summary of the principles of specific corrective treatment:

. . . In the application of force to a lesioned joint to "correct" an abnormal condition, it must be remembered that the force must be accurately controlled, accurately localized, and judiciously applied. The primary purpose of this technic is to stretch specific structures with the idea of removing the restriction of joint motion. The implication that freedom of joint motion is the criterion of a normal joint is true only in the sense that a joint capable of free motion must of necessity be free of inflammatory change restricting its motion. The application of force must then be sufficient to effect a stretch of the inflamed tissue in the desired direction and only to the desired degree.

The principles of correction as given by Hulett[35] include:

1. Exaggeration of the lesion
2. Rotation
3. Pressure or thrust.

Hulett's[35] reasons for exaggeration of the lesion are given as follows: "to free the articular structures," for "stretching and relaxation of the deeper structures," and the "benefit of recoil."

Lippincott[36] describes a somewhat similar technic employing a similar principle:

1. Exaggeration of the lesion to cause "tension of the weakened elements" to match the tension of those elements not strained; this is then the "point of balanced tension."

2. At the point of this balance, the "respiratory or muscular cooperation of the patient is employed to overcome the resistance of the defense mechanism of the body to the release of the lesion."

I am certain that this is too hasty a summary for a fair evaluation of the principles suggested, but it would seem important that the particular indications for such technics might be studied. Clinical evidence would suggest that in lesions associated with any degree of pain or acuteness, exaggeration of the lesion would increase the pain and inflammation, and conversely, a movement which increased the pain or referred effects would seem to indicate a motion to be avoided.

Downing[37] is clear in describing the principles of adjustment of an anterior or extension group of occipital lesions:

1. Flexion (forward bending)
2. Sidebending to gap the side to be moved
3. Counter fixation (apparently the blocking of the atlas)
4. Rotation.

His description of the correction of a typical cervical lesion is more complicated:

1. Use of vertebral "lock"
2. Sidebending toward side of lesion
3. Reverse rotation
4. Further approximation by vertex pressure
5. Adjustment parallel to the plane of the articulation.

There appears to be some inconsistency in these two groups of principles, that is, in the occipital lesion, sidebending to gap the affected side, and in the typical cervical lesion, sidebending to the side of the lesion with additional downward (vertex) pressure. It is my belief that the usual axiom, "Sidebend toward—rotate away from," is applicable to steps rather than to final positioning. The first step consists of a movement sufficient to relieve the tension of the scaleni, sternocleidomastoid, and other long muscles so that the second step, which actually refers to the affected segment, will produce the combination sidebend-rotation movement more typical of cervical joints and begin to produce movement in the plane of the articulations. The deliberate approximation of facets would seem a source of increased irritation. The unaffected or less affected side might be approximated in order to serve as a pivot point in the tripod type of correction advocated by Webster.[38] Magoun[17] has emphasized the principle of a "gap" at the articulation and has remarked that *"Inflamed joint surfaces should never be crowded."* Tasker[39] gives an easy exposition of the principles of cervical correction: ". . . the movement, or series of movements, must be made so as to overcome the influence of a dominant muscle group." He describes extension (longitudinal traction) as the simplest procedure. Torsion and counterpressure are described as requiring more skill:

. . . The corrective rotation movement is always associated with a little flexion or extension, according to the character of the lesion. The head is rocked gently in the direction required for the correction and when the rotation reaches a point where the resistance in the lesion is felt, the operator strives to create a condition of relaxation by admonishing his patient not to resist, so that by a sudden but very slight increase in rotation the lesion will receive the full effect of the movement and yield to it.

Discussions of "locking" can become very complicated. The essential meaning of a lock is tension, whether osseous, ligamentous, or muscular, produced by motion or by gravity or inertia which will tend to keep the desired motion at the lesioned area. In the cervical area, part of the locking is eliminated by the direct action of the fingers, thumb, et cetera, on the upper of the two affected structures. The supine position is most conducive to cervical technics because of the weight of the body resisting traction or rotational movement.

It will be noted that rotation, or sidebending-rotation, was repeated as one of the principles of cervical correction. Beckwith[40] states, "It is characteristic of the cervical spine that most restriction in motion occurs as a result of a fault in rotation." Dunnington's[2] emphasis of rotation strain has already

been mentioned. Movement in the sagittal plane (flexion or extension) is the most free movement throughout the spinal column and is accompanied by alternating muscle activity and ligamentous stress. Sidebending when or if it occurs alone would similarly affect structures alternately. Torsion and rotation place all ligaments under stress and may involve (especially torsion) a continuous muscular activity. Whereas flexion and sidebending produce the greatest strain on the *nuclear* elements of the disk, rotation or torsion produces the greatest strain on the *lamellar* elements. Torsion or rotation interferes with motion in all other directions (although the converse of this is likewise true) and hence interferes with the righting action of the ligamentum flavum.[41]

The importance of this "elastic syndesmosis," as Morris[42] describes the ligamentum flavum, can be realized because it is so much a factor of the joint anatomy and therefore a two-fold factor in vertebral mechanics. It is attached at the edge of the intervertebral foramen and is in relation to the spinal dura (continuous with the fibrous tissue external to the foramen) and forms part of the inner margin of the articular processes. This suggests that lesion processes not only involve the mechanics of the ligamentum flavum but that the lesion process may be an important factor in the production of pathology of the ligamentum flavum.[43,44] In the cervical area, the combination sidebending-rotation motion characterizing the most frequent lesioning is noted as a palpable posterior prominence of the articular column.

The diagnosis of this or any other positional relationship implies the reversal of the pathway as the required correction. Gapping of the articulation will aid in the movement or may constitute an important part of the correction where synovial damage has been a major part of the pathology. I would select then the following principles of correction to apply in the cervical area:

1. Positioning of the shoulders, neck, and head so as to minimize soft tissue strain over the lesioned area (especially the long muscles)

2. Accurate placing of the springing or thrusting force behind the articular pillar of the vertebra to be moved

3. Tension localized at this point if possible by traction or by pivoting on the unaffected joints so as to gap the affected articulations

4. Gentle springing or minimal thrust added to this tension in the direction indicated by the restriction and in the plane of the articular fissure. Even in springing, the tension (see (3) above) should not be completely lost once started, or voluntary splinting may occur. If the patient's resistance increases with the application of this tension, the positioning is incorrect or the patient is not properly prepared and further force should be omitted. If this phase can be combined with respiratory motion, especially in the sense of the normal relaxation of exhalation, the maneuver will be that much easier.

Concerning the occipitoatlantal articulation, I will mention only one maneuver with one modification, believing that it applies to the commonest positions of this joint, and that in the other less discernible positions of restriction, the articulatory or springing technic should be applied. The position I have mentioned before as most common is posterior prominence of the occiput, especially on one side, with possible downward and medial nodding of the occiput. In correction, the head is supported in slight rotation away from the affected side, the head is slightly sidebent *away* from the affected side, then the thrust is produced (without increasing the motion of the supporting hand), behind the occipital prominences in an upward lateral direction.

In the atlantoaxial joint with its commonest restriction in pure rotational movement, the head is carefully balanced so that rotation will occur about the longitudinal axis of the column, the rotation movement is free of any sidebend but sufficient traction is added to gap the articulations and overcome the slight hump afforded by the slope of the superior facets of the axis.

Again for the benefit of the student, let me repeat a few cautions in cervical corrective technics:

1. Accurate diagnosis should be a primary aim, and minimum force should be used so as to eliminate pain and trauma.

2. The portion of the hand used for correction or springing should be placed close to the spinous process, then allowed to sink in laterally along the lamina, pushing the muscles before it rather than pinching so that the effective force will culminate behind the articular pillar. (The transverse processes are so placed, anterior to the articulations, that attempted pressure to them will only result in painful pressure to the muscles.)

3. The position of the head in rotation has very little effect on the position of the lower cervical spines and should not mislead the physician in the position of thrusting force in the lower cervicals.

4. Cervical traction can affect the spinal dura, not only because of the close relationship to the floor of the suboccipital triangle, and the attachments at the upper cervicals and foramen magnum, but because the dura of each spinal nerve is continuous with fibrous tissue in the intervertebral foramen and thence connected to the periosteum. In acute lesioning with periarticular inflammation, straight traction may produce unilateral pain and possible paresthesias, numbing, tingling, et cetera. Gapping of the facets is desirable but must be combined with the reversing of positions of strain. Slight straight traction may help to localize the level of involvement. If bilateral stretching is experienced without increase of pain on one side, then the maneuver is safe and may serve to increase drainage of the disk and articular areas.

With our emphasis on the nature of traumatic lesions, and our concern with the local pathology of lesions, we must not lose sight of the extensive effects of cervical lesioning and therefore their importance as basic etiology in innumerable visceral pathologies, but these considerations transcend the purposes of this paper. Discussion of altered mechanics (secondary lesions) as a result of visceral pathology (viscerosomatic reflex effects) is omitted for similar reason. Burns[45] has indicated some points of differentiation to which we would refer the student.

SUMMARY AND CONCLUSIONS

A classification of types of cervical manipulations has been offered, with some discussion of the principles underlying the application of each type. A concept of the lesion process or lesion components and stages of lesion pathology has been emphasized as a factor in determining the type of treatment.

A discussion of some divergent principles of correction has been attempted with a final set of principles

offered which, while not indicating the specific manipulation for every type and position of restriction, nevertheless, underlies effective technics in the cervical area.

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The Treatment of Strabismus in Childhood*

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Working with children with strabismus gives the ophthalmologist the satisfaction that the orthopedist must feel when he straightens a child's deformed leg, or the pediatrician when he patiently re-educates muscles injured by poliomyelitis. For the cross-eyed child is handicapped as truly as is the crippled child, and where the crippled child evokes sympathy, the one with strabismus far too often is held up to ridicule. In the past parents were often sensitive about these children, but did nothing. With the general trend toward early treatment of abnormalities, more of these cases are receiving prompt attention.

This paper is not intended as a technical discussion of strabismus, but as a general presentation of the subject emphasizing its classifications and diagnosis, types of treatment for correction, and the proper time for instituting treatment of the various types.

There are three main groups of strabismus. The most common is the concomitant type which comprises probably 90 per cent of cases. In this type the pupillary distance always remains the same. The eyes may diverge, in which case the pupillary distance is greater than normal; they may converge and the pupillary distance be less than normal or the eyes may deviate vertically. Another classification is para-

Fig. 1

Total correction with glasses in a child aged 9 with monocular concomitant esotropia. Right eye fixes in all fields. Condition first noted at 1 year of age. Left eye amblyopic. Correction is as follows:

R.E. + 4.75 sphere ⊖ — .50 cyl. ax. 180 = 20/25-3
L.E. + 4.75 sphere ⊖ — .50 cyl. ax. 30 = 20/200

*Presented at the Fifty-fifth Annual Convention of the American Osteopathic Association, Milwaukee, July 18, 1951.

Fig. 2

Surgical correction of monocular concomitant esotropia. Right eye fixes in all fields.

lytic strabismus in which one or more of the six extrinsic ocular muscles are involved. However, this condition rarely is found in children. A third group includes anomalies of conjugate and associate movements, the most common of which is divergent excess. It is found frequently in children and is the easiest type to correct surgically. Anomalies of conjugate movements are rare.

Strabismus seen at birth may be an anomaly of one or more muscles. The muscle may be too strong or possibly hypertrophied, thus holding the eye in a fixed position (strabismus fixus or retraction syndrome.)[1] These cases are always congenital and often hereditary. There also may be a faulty attachment of a muscle or faulty innervation to one or more muscles possibly caused by congenital malformation,

Fig. 3

Total correction with glasses of periodic concomitant esotropia. Right eye fixes most of the time. Condition first noticed at 1 year of age. Extreme correction is as follows:

R.E. + 9.00 sphere ⌒ — .50 cyl. ax. 180 = 20/30
L.E. + 9.00 sphere ⌒ — .50 cyl. ax. 180 = 20/30

heredity, or a birth injury. An occasional case of innervational paralysis is attributable to difficult labor and forceps delivery.[2]

If deviation is not apparent until about the sixth or seventh month, or even until the child is around 4 years old, the cause is usually an accommodative factor such as a high degree of hyperopia or myopia, particularly when associated with anisometropia. Though this type of squint may develop at any time from the sixth month to the sixth year, the majority begin between the first and third years.

Another cause of strabismus in infants is an anomaly of the fusion center in the brain resulting in alternating concomitant squint. These children may have perfectly normal vision in both eyes and will have perfectly normal muscle action in each eye individually, but because of this abnormality within the fusion center, the eyes do not coordinate.

Acute illness and general diseases account for a small percentage of strabismus in children. Many concomitant cases are first noticed during an acute illness, such as whooping cough, measles, et cetera, but usually the underlying cause of concomitant strabismus is an accommodative factor such as high degrees of hyperopia or myopia, and the illness weakens the child so that the defect becomes evident.[3] Paralytic squint sometimes is traceable to illnesses such as diphtheria, meningitis, poliomyelitis, or congenital syphilis.

Convergent squint occasionally is of nervous origin. The condition usually is temporary and can be helped more by the pediatrician than the ophthalmologist. A child with squint accompanying chorea,

Fig. 4

Surgical correction of monocular concomitant esotropia.

one needing circumcision, or one having any general condition causing extreme nervousness responds quickly to treatment directed at the primary cause. Osteopathic manipulation is particularly beneficial in these cases.

The greatest number of cases of concomitant strabismus are monocular, as the child fixes with only one eye in all 6 fields of gaze. There is usually a high refractive error with a greater error in one eye than in the other. The deviation may be corrected entirely with glasses or may not be helped at all depending upon whether an accommodative factor is involved.

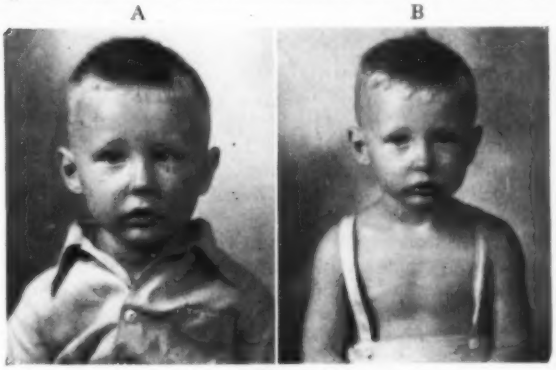

Fig. 5

Child aged 3. A. Monocular concomitant convergent squint. Right eye fixed in all fields. Beginning amblyopia in left eye. B. Results of tucking of the left external rectus muscle and recession of the left internal rectus. Normal vision in each eye 4 weeks after operation.

Early correction is extremely important in these cases since often one eye becomes amblyopic through disuse before treatment is started.

Alternating concomitant strabismus presents a different problem. Here occasionally convergent squint is found with myopia or divergent squint with hyperopia. A lens correction for these patients would merely exaggerate the deviation.

In periodic strabismus the eyes appear perfectly normal until the child becomes tired or ill, whereupon they deviate. Rest brings them back into line. The condition usually is due to accommodative errors. If it is neglected, a monocular type may develop. However, with refractive correction, orthoptic training, and osteopathic manipulative care, response usually is good and nothing more need be done to correct the deviation.

In the relatively few cases of paralytic squint in children an important symptom, seldom found in other types of strabismus, is present. There sometimes is rotation of the face to the right or left, or a tilt of the head forward, backward, or to the right or left shoulder. If a child constantly holds his head in any of these positions, paralysis of one of the ocular muscles should be suspected. A head tilt may mean paresis of one of the elevator or depressor muscles, which will produce a vertical anomaly. Face rotation to the right or left with no head tilt, if of ocular origin, always means anomaly of one or more of the horizontal rotators. The child holds his head in these various positions to avoid double vision. Contractures of the cervical muscles on one side or the other may eventually develop if the cause is not corrected.[4]

In making a diagnosis as to the type of strabismus, the physician must give important consideration to the child's past history, and in treating the case he must have the complete cooperation of the parents. Conservative methods of treatment are preferable if they will obtain results even though more time and patience are required. However, if prolonged treatment calls attention to the defect and emphasizes it in the child's mind, psychologic trauma may result.

If the eyes appear improved under the influence of a cycloplegic used in examination, conservative treatment is likely to be effective. Certainly any of the concomitant types, whether divergent or convergent, should be corrected with glasses if possible. Periodic strabismus usually responds well to correction of refractive errors and surgery rarely is necessary.

If a refractive error is present, it should be corrected. Glasses should be worn for a sufficient length of time to determine their full value, if there is a chance that this correction will relax the muscle spasm and straighten the eyes. The full benefit of glasses will be realized within 3 months of constant use. However if correction of the refractive error does not effect some improvement within two weeks, full correction is not likely with this method.

A course of fusion training carefully planned and executed may prove beneficial in cases involving the alternating type of strabismus caused by poor fusion. This training should be under the constant supervision of both the ophthalmologist and the pediatrican or family doctor, as prolonged orthoptic training often has a poor psychologic effect on the child. It must be remembered that a happy, well-adjusted child, not the improvement of fusion alone, is the ultimate goal. If satisfactory results from fusion training are not obtained within a few weeks, or if orthoptic exercises must be continuous to maintain the results, training should be discontinued for the child's well-being.

Most ophthalmologists are doubtful of the amount of permanent correction that can be effected in the 15 or 20 minutes of exercise in 24 hours, and longer daily training periods are almost impossible with young children. Even with improvement, results of fusion training are only temporary, and the eyes eventually revert to the original condition if training is discontinued. The greatest value of orthoptic training lies in its use as an adjunct to correction of refractive errors or to surgery, to supplement the results of these procedures.

Strabismus should be corrected by surgical means when no improvement is obtained by nonoperative therapy, and when the success of surgery can be estimated with reasonable accuracy before the operation is performed. In some cases, surgery may be undertaken safely when the child is 18 to 20 months old, while others should be treated conservatively until the child is 3 or 4 years old. In any case, a good cosmetic effect by the time the child is of school age should be the ultimate goal for both his physical and psychologic benefit.

Sugery usually is advisable around the third year for monocular concomitant squint that has developed very early in life. Before the operation every effort should be made to have the child use the weaker eye by prescribing glasses, static retinoscopy, and occlusion of the stronger eye for short periods. If neglected the child will suspend use of the weaker eye and within a few months will develop amblyopia. Once amblyopia is well established it is difficult and usually impossible to improve the vision much unless the child is very young. After the tenth year there is little chance of restoring vision.[5] Children who develop a deviation later, at around 3 to 6 years old, should have surgical correction as soon as conservative treatment has proved ineffective.

Children suffering from alternating strabismus will not develop amblyopia; therefore, from that standpoint alone, surgery is not urgent. However, fusion is effected sooner and more easily if operation is not delayed too long. Psychological benefit to the child is another reason for getting the eyes straightened as soon as possible.

Operation for paralytic squint rarely is advised unless the eye deviates markedly in the primary field of gaze, and when indicated usually is performed mainly for better cosmetic effect.

Whatever the method of treatment, whether refractive, orthoptic, general, or surgical, that which offers the child the best chance of correction should be undertaken early. Delay is harmful from both psychologic and physical standpoints, as children afflicted with strabismus are subjected to ridicule outside regardless of how carefully they may be sheltered from it at home. They may become retiring and refuse to mix with other children or may become overly aggresive and uncooperative. Personality changes caused by strabismus are hard to estimate until the condition has been corrected and a completely new outlook develops in the child.

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ANESTHESIOLOGY

THE JOURNAL is proud to present to its readers in this issue the first Supplement contributed by the American Osteopathic Society of Anesthesiologists, which represents their first official publication. The Society is not only youthful organizationally, it is relatively youthful in its membership. Its members show pardonable pride in their work and they manifest the finest professional ideals. They have an able leadership. There is no field in osteopathic medicine which places a greater responsibility upon the physician. This Supplement presents its own best evidence that its members are meeting this responsibility within the finest traditions of medicine.

The Society in itself represents a distinctive achievement in the history of specialization within osteopathic medicine. It had its beginnings in the abortive attempt to organize such a group in the early forties, centering around individuals who had been previously recommended for certification in anesthesiology by the American Osteopathic Board of Surgery. A second move toward the organization was begun in 1947 and successfully consummated in 1949, when the Board of Trustees of the American Osteopathic Association granted affiliate status to the American Society of Osteopathic Anesthesiologists. In 1951 the Society was permitted to change its name officially to the American Osteopathic Society of Anesthesiologists.

The progress of anesthesiology in the osteopathic profession runs parallel to its development as a specialty in allopathic medicine. As early as 1939 THE JOURNAL published an article on anesthesiology as it related especially to the osteopathic profession.[1] Within a decade (since 1929) anesthesia had developed into an important specialty of medicine and an indispensable ally of surgery. At that time there was an extreme shortage of anesthetists in the United States, and authorities doubted if it could be adequately met for at least 15 years. Residencies in medical institutions numbered only thirty-eight. Since that time, but more especially since World War II, anesthesiology has become an established specialty of allopathic medicine with a relative development in osteopathic medicine.

The establishment in 1939 of an Advisory Board for Osteopathic Specialists was unmistakable evidence of the profession's conviction that it must develop properly trained staffs to man its institutions. Specialists in anesthesiology were generally recognized as one of their greatest needs. Anesthesiologists, acutely aware of the problem, pointed out that by setting up standards in that specialty the profession "could avoid practices which are questionable merely by rejecting such practices before they became ingrained."[1] Since that time specialization has made excellent progress in every field. This Supplement presents concretely the progress that anesthesiology has achieved in osteopathic medicine. Yet, as in other hospitals, the need for anesthesiologists in osteopathic hospitals far outruns the supply. The day is past when an osteopathic hospital can properly develop without a department of anesthesiology supervised by a physician anesthesiologist. If technical anesthetists are required they should work directly under such supervision and be responsible only to the anesthesiologist. The Society as a teaching group should establish as its goal a physician anesthesiologist serving every institution in which anesthesia is required.

There are many challenges which anesthesiology as a specialty of medicine has to meet. They are well outlined in a recent article[2] in which the author discusses at length the professional, sociologic, ethical, educational, and economic challenges inherent in the practice of anesthesiology. All of these challenges are significant. They present themselves to all anesthesiologists regardless of schools of practice. The relationship between the anesthesiologist and the institution in which he practices is at the basis of the economic challenge, and constitutes a problem in itself. Anesthesia is the practice of medicine on a fee-for-service basis, and it is as such that any physician will be interested in the specialty. Under the present system of medicine, strike at that basis and the supply of such specialists may be seriously affected. This economic challenge will constitute an increasing problem for the American Osteopathic Hospital Association. The Society will need to exercise leadership in this problem in order that anesthesiologists and institutions in no way hamper the quality of medical care which they are obligated to render the patient.

The educational challenge to anesthesiology is being well met. Our newer anesthesiologists are no longer pioneers, no longer largely self-taught. The Society of Anesthesiologists, the Bureau of Hospitals, and the Board of Surgery have responded to the educational needs of anesthesia with a positive program.

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Prior to 1947 a few osteopathic hospitals independently established preceptorships in anesthesiology, but that year the Bureau of Hospitals set up the first approved residencies. The residency program has moved forward until there are twenty-four approved residencies in fourteen osteopathic hospitals. The annual meeting of the Society, the source of this Supplement, can well serve as a refresher course program. It is hoped that the Society will evolve a plan for preceptorships, and work out instruction centers to which general practitioners, engaged to a degree in anesthesia, will be encouraged to come for from 1-day to several-weeks courses.

Credit belongs to the Board of Surgery for its early encouragement of osteopathic physicians to specialize in anesthesia. This body recommends to the Board of Trustees of the American Osteopathic Association all individuals who meet the qualifications prescribed by it for applicants for certification in surgery and allied fields, including anesthesiology. Osteopathic physicians interested in this latter specialty should write the secretary of the Board of Surgery for detailed requirements for examination.

THE JOURNAL congratulates the officers and members of the Society of Anesthesiology on this first Supplement.

IMPORTANT MEDICOLEGAL DECISION

Important principles in medical diagnosis and therapy were emphasized in the recent opinion handed down by the U. S. Court of Appeals for the Fifth Circuit in the case of U. S. v. Hoxsey Cancer Clinic, a partnership, and Harry M. Hoxsey, an individual. The principles enumerated by the Court of Appeals are founded upon the teaching and experience of modern medicine and are an integral part of the training of all osteopathic physicians and have been for many years. As enunciated by the Court, the principles were based upon the testimony given by cancer experts at the time of the trial, and are phrased as follows:

[1.] . . . there is only one reliable and accurate means of determining whether what is thought to be cancer is, in truth and fact, actually cancer. This requires a biopsy, a microscopic examination of a piece of tissue removed from the infected and diseased region.

[2.] . . . the opinion of a layman as to whether he has, or had, cancer, or a like opinion as to whether he has been cured and no longer bears the disease, if, in fact, it ever actually existed, is entitled to little, if any, weight.

[3.] . . . despite the vast and continuous research which has been conducted into the cause of, and possible cure for, cancer the aggregate of medical experience and qualified experts recognize in the treatment of internal cancer only the methods of surgery, x-ray, radium and some of the radioactive by-products of atomic bomb production.

[4.] . . . upon such subjects a Court should not be so blind and deaf as to fail to see, hear and understand the import and effect of such matters of general public knowledge and acceptance, especially where they are established by the overwhelming weight of disinterested testimony. . . .

The opinion is the result of an appeal from a case which had been tried in the U. S. District Court at Dallas, Texas, in December, 1950. It reverses the judgment of the trial judge and directs that the trial court issue an injunction prohibiting the defendant from distributing in interstate commerce brownish-black and pink liquids intended for the treatment of cancer in man.

The Food and Drug Administration, Federal Security Agency, states that over a wide area people are taking the Hoxsey medicines in the belief that they may be an effective treatment for cancer. Several osteopathic physicians offered testimony favorable to the methods employed by the Hoxsey Clinic, and one, a Dr. J. B. Durkee, was at the time of the trial the director of the clinic. Osteopathic physicians are frequently questioned concerning this treatment by relatives and friends of cancer victims. This information is published so that physicians will have it at hand when they are queried about the legal status of the methods employed by Mr. Hoxsey.

The Hoxsey Clinic is located in Dallas, Texas, and shipped its drugs to patients in many other states. The Court of Appeals unanimously concluded that "the overwhelming weight of the credible evidence requires a conclusion that the representation that the Hoxsey liquid medicines are efficacious in the cure of cancer is . . . false and misleading. The evidence as a whole does not support the finding of the trial Court that 'some it cures, and some it does not cure, and some it relieves somewhat.'" The immediate result of this reversal is to remand the case to the trial court, with directions to issue an injunction against the defendants enjoining them from shipping in interstate commerce the remedy that was misbranded within the meaning of the Federal Food, Drug and Cosmetic Act. The trial court had previously (December 21, 1950) ruled in Hoxsey's favor and denied the injunction.

The defendant, Harry M. Hoxsey, is not a doctor but a layman. He credits his grandfather with originating the treatment about 1840 in Kentucky. The defendant's father used the Hoxsey cancer drugs, and from 1919 on the present Mr. Hoxsey has carried on the treatment.

The Hoxsey medicines are of two types, one for internal and the other for external use. The external treatment, which is escharotic, was not involved in the action. It is the internal treatment that was claimed by the government to be misbranded within the meaning of the Federal Food, Drug and Cosmetic Act.

The internal treatment is composed of two medicines known as the black or brownish-black medicine and the pink medicine. The black liquid is composed of potassium iodide and extracts of buckthorn, prickly ash, red clover blossom, alfalfa, and cascara sagrada, sugar, and water. The pink remedy is chiefly lactate of pepsin containing variable amounts of potassium iodide.

The Court called attention to expert pharmacologic testimony as establishing the fact that the ingredients shipped by Hoxsey in interstate commerce are of no value in the treatment of cancer. Similar evidence also showed that the cancer medicine could cause damage to persons suffering from cancer.

The Court of Appeals discussed at considerable length the finding of the trial court that the Government had failed to carry the burden of establishing

the truth of the allegations of its complaint. They went on to state:

To the contrary, we think that the evidence in this case, considered as a whole, should, and must, induce a conviction that the finding of the trial Court that the representations were neither false nor misleading is so "against the great preponderance of the credible testimony that it does not reflect or represent the truth and right of the case." On the entire evidence we are "left with the definite and firm conviction that a mistake has been committed." (case cited) We recognize, as we must, that the cause, effect and cure of cancer are so obscure and indefinite that there obtains in the entire subject an area of the unknown. It is nevertheless the duty of a Court in making determination of questions of such great public moment as those which now confront us to give weighty consideration to the experience of the past and the accepted views and findings of science as held and confirmed by such experience and as likewise shown by the weight of the testimony to be applicable to the specific facts of this case. In this, as in other similar matters, that not all, or even little, is known about the subject does not require us to disregard that which is known and established. We do not have for consideration the merits even of any claimed newly discovered, or secret, drug or cure. The case involves the efficacy of only well known drugs. As a cure for cancer these have been weighed and found wanting.

The decision constitutes a reversal of the judgment of the trial Court, and the case was remanded with direction that the trial Court issue an injunction.

The decision as it stands constitutes a setback for Mr. Hoxsey. He is enjoined from shipping the Hoxsey liquid medicines in interstate commerce. The arsenical powder sold by Hoxsey in cases of external lesions is not involved. Under the law the defendants have the right to petition for review by the U. S. Supreme Court.

PRINCIPLES OF OSTEOPATHY

The Academy of Applied Osteopathy has just published its first major text, "The Principles of Osteopathy," by Leon Page, D.O. A review of the book will be found on page 151 of this issue of THE JOURNAL. The production within a year of two books dealing basically with phases of the osteopathic concept is an indication of the high degree of interest in the philosophy of osteopathic medicine.

Notes and Comments

An increasing number of osteopathic physicians are finding themselves concerned with health and medical programs for industrial workers. The literature is voluminous and widespread but not readily accessible. The Public Health Service, in recognition of the needs of industrial physicians, nurses, and others concerned with industrial health, has just made available a reference manual, "Industrial Health and Medical Programs," which can be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for $1.00. The text consists entirely of direct quotations from 260 books and publications. The volume is divided into eight sections dealing fully with such topics as "Types and Extent of Plant Health and Medical Service," "Professional Personnel in Plant Health and Medical Services," and "Facilities, Equipment, Records, Costs, and Values of Plant Health and Medical Services." There is nothing comparable to this manual, and it is invaluable in its field.

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The relation of heavy smoking to lung cancer is a matter of increasing interest and study among experts in the field. An international working conference on lung cancer was held July 21-23 at Louvain, Belgium, for the purpose of coordinating research on the etiology of lung cancer on an international level. It was reported there that there is an increase in lung cancer in seven northern European countries, similar to that noted in the recent cancer morbidity surveys of ten American cities. Discussion of possible contributing factors narrowed to increased use of carcinogenic chemicals in manufacturing processes, atmospheric pollution, and the increased consumption of tobacco, especially cigarettes.

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A recent issue of the *Journal of Cellular and Comparative Physiology* (April, 1952) contained an article on "Changes in Inorganic Substances in Mammalian Nerve Cells Due to Starvation," by Carrie C. Gillaspy, Associate Professor of Anatomy, Des Moines Still College of Osteopathy and Surgery. The *Anatomical Record* (February, 1952) published an abstract of a paper which was presented by Miss Gillaspy at the March, 1952, meeting of the American Association of Anatomists at Providence, Rhode Island. The title of her paper was "Experimental Study of the Cranial Motor Nuclei in Reptilia."

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Osteopathic physicians concerned with routine chest examination will find the four-page "Report of the Joint Committee on Chest X-Ray" of value. It can be obtained by request from The American College of Chest Physicians, 112 East Chestnut Street, Chicago 11, Illinois.

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Rehabilitation in a country where skilled manpower is in short supply is a matter of increasing responsibility to medicine. In an article appearing in the April 25, 1952, issue of *The Bulletin of the University of Minnesota Hospitals*, Frederic J. Kottke, M.D., points out that a successful rehabilitation program is usually directed toward three major activities: prevention of deterioration of body tissues resulting from inactivity, efficient direction of patient therapeutic

activities, and coordination of all necessary therapies to insure continuous progress toward rehabilitation. The entire article is worthy of careful study by those in charge of hospitals and institutions. The article is of immediate interest in relation to the recovery from poliomyelitis but its significance is as wide as the incidence of the hospitalized patient of any type. Write the University of Minnesota Press, Minneapolis 14, Minn.

★ ★ ★

"No patient who has asthma should smoke" is the opinion of four physicians of the Division of Medicine of the Mayo Clinic. *Proceedings of the Staff Meetings of the Mayo Clinic* for August 13, 1952, carries a brief statement in strong support of this dictum. The physicians point out "Just as a patient will never receive very convincing advice about reduction of weight from an obese physician, so also he or she may not be told to stop smoking by the physician who himself is a heavy smoker."

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A health manpower survey was recently completed for the Office of Defense Mobilization and the results reported in the August, 1952, issue of *Public Health Reports*. The acute shortage of professional and technical personnel in the United States is held to be the most serious problem in the field of public health. In 1951, 10 per cent of all budgeted positions were vacant. Vacancies were especially numerous in positions for physicians, nurses, and engineers. To bring existing local health standards up to minimum recommended standards, it is estimated that there would be need for nearly 1,000 physicians and 10,000 nurses. There is little hope for a greatly increased supply of public health workers while the mobilization for defense continues.

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Osteopathic physicians will be interested in an article appearing in the August, 1952, issue of *Archives of Physical Medicine* entitled, "Tables for Elongation in the Treatment of Sciatica." The therapy is recommended "as a valuable adjunct in the management of sciatica in patients who do not respond to heretofore usually employed conservative measures." The entire article is interesting corroborative material on the mechanical effects that have long been secured by osteopathic physicians in such cases, with and without the employment of a mechanical table. The author calls attention to numerous tables designed for vertebral elongation but recommends in particular the table known as the Godet. Principle of the table is similar to one long employed by osteopathic physicians.

★ ★ ★

"Diagnosis and Treatment of Scapulocostal Syndrome," by Allen S. Russek, M.D., is an article of interest to osteopathic physicians which appears in the September 6 issue of *The Journal of the American Medical Association*. The diagnosis and treatment are carefully detailed with emphasis upon altered scapulothoracic relationship as a cause. Injection of trigger points is recommended to be followed by "elimination of the altered scapulothoracic relationship by physical or mechanical means."

★ ★ ★

The plasma substitute, periston, is being stockpiled by the Federal Civil Defense Administration. There are a number of plasma substitutes but only those that approximate plasma in their ability to exert and maintain colloidal osmotic pressure are considered of any real value. Gelatin gives promise but it is more expensive than periston; it is less apt to be stored in the body or to cause cell damage if used in large quantities. Periston was used over 500,000 times by the Germans in World War II. Its stability, ease of administration, and low cost—less than $2.00 for 500 cc.—make its use advantageous.

★ ★ ★

Clinical evaluation of various tests for occult blood in the feces should be used only as an adjunct to clinical study and interpretation, in the opinion of the authors of an article on "Detection of Occult Blood as a Routine Office Procedure," appearing in the August 23 issue of *The Journal of the American Medical Association*. In a group of 1,000 patients subjected to the guaiac test there were 4 patients with frank malignant lesions of the alimentary tract who did not have guaiac-positive stools as opposed to 6 patients with similar malignant lesions who did have guaiac-positive stools. The authors conclude that there is no shortcut to the diagnosis of malignant and premalignant diseases of the alimentary tract. A carefully taken history, complete physical examination, x-ray studies, and proctoscopic examination are still necessary.

Boards of Specialty Certification

AMERICAN OSTEOPATHIC BOARD OF INTERNAL MEDICINE

Examinations will be held at Hotel Huntington, Pasadena, Calif., October 11, 12. Address the secretary, Glennard E. Lahrson, D.O., 460 Staten Ave., Oakland, Calif.

AMERICAN OSTEOPATHIC BOARD OF SURGERY

Examinations will be held in the specialty fields of Surgery, Orthopedic Surgery, Urological Surgery, and Anesthesiology at Neil House, Columbus, Ohio, October 25, 26. Address the Corresponding Secretary, E. F. Martin, P.O. Box 474, Coral Gables, Fla.

CORRECTION

The officers and members of the American Osteopathic Board of Radiology and of the American Osteopathic Board of Surgery listed below were omitted from the Roster published in the September, 1952 JOURNAL. We regret the error.

AMERICAN OSTEOPATHIC BOARD OF RADIOLOGY (October)

Chairman—A. H. Witthohn **Vice Chairman**—Clyde C. Henry
Secretary-Treasurer—Jack H. Grant
Members—M. C. Pettapiece, William L. Tanenbaum, Burwell S. Keyes

AMERICAN OSTEOPATHIC BOARD OF SURGERY (July)

Chairman—James M. Eaton **Vice Chairman**—Lucius B. Faires
Secretary-Treasurer—Arthur M. Flack, Jr.
Members—Arthur B. Funnell, Howard A. Graney, K. George Tomajan, Don E. Ranney, William G. Stahl, Charles L. Ballinger

Department of Public Affairs

DONALD M. DONISTHORPE, D.O.
Chairman
Los Angeles

BUREAU OF PUBLIC EDUCATION ON HEALTH

HOBERT C. MOORE, D.O.
Chairman
Bay City, Mich.

OCCUPATIONAL LICENSING LEGISLATION IN THE STATES

The Council of State Governments, 1313 East Sixtieth Street, Chicago 37, Illinois, in June, 1952, published an important document entitled "Occupational Licensing Legislation in the States," which is a study of state legislation licensing the practice of professions and other occupations. It may be purchased from the Council for $3.00 a copy. Mr. Frank Bane, Executive Director of the Council, states in the Foreword:

> The Governors' Conference in its Forty-third Annual Meeting in September, 1951, requested the Council of State Governments to make a survey of professional and occupational licensing practices in the several states.
>
> In preparing this study the Council has worked directly through the offices of the Governors, with the cooperation of the central departments of registration or licensing and, where no central department of licensing existed, with the hundreds of individual licensing boards themselves.
>
> The report deals with licensing by state governments as an instrument for regulating the entrance into and continued practice in professions, trades and other occupations. It is concerned primarily with problems of public health and welfare; problems of potential monopoly—the barriers to the free choice of an individual in selecting his vocation; and the extent to which state officials have effective control over the administrative machinery of examination and licensure.
>
> It is hoped that the report will provide essential background information bearing on the basic issues involved in the present licensing systems in the several states.

This report is probably as comprehensive a study of the problems and factors involved in coordinating the public and private interests in the regulation and control of occupations and professions as has been made. It first discusses the nature of the problem which faces legislatures in attempting to establish a proper balance between freedom and order. The danger in modern democracy of overemphasis or underemphasis is recognized. The role of government in reconciling public and special interests is stressed. The extraordinary increase in state legislation requiring governmental examination and licensure in order to practice professions and trades occurring in the past two generations is noted.

The second chapter enumerates the scope of the regulated groups and their definitions. It is stated that, "the essential elements of licensing involve the *stipulation of circumstances* under which permission to perform an otherwise prohibited activity may be granted—largely a legislative function; and the actual granting of the permission in specific cases— generally an administrative responsibility." The osteopathic profession is listed under the designation, "Osteopath," and except for this obsolete designation, is recognized throughout the publication as a leading profession in the healing art field. The American Osteopathic Association cooperated and consulted with the Council in the accumulation of information and statistics pertaining to the osteopathic profession.

The third chapter is devoted to a history of occupational licensing in Europe and America. The historical factors which influenced the development of the present licensing system are reviewed from the days of the medieval guilds of merchants, craftsmen, and the professions to the close of the nineteenth century with the organization of the occupational groups into labor unions. The economic revolution of the nineteenth century is attributed as the cause of the recognition of numerous new occupations and professions and the extension of the type of organization to these groups which had formerly been limited to the professions of law and medicine. The chapter is concluded with the statement that "at the time of the Civil War no effective state licensing system was in operation, and standards of professional competence were badly in need of reform." It was not long after this time that the osteopathic profession entered the professional scene and many of its early problems can be better understood in the light of the history here presented.

The following chapter describes the "Trends in Contemporary Occupational Organization." The five major trends since the Civil War are listed and discussed as (1) organization of occupational groups into national societies and associations, (2) increase in the number of occupations licensed, (3) increasing centralization of the control of licensing, (4) the trend from optional certification to compulsory licensing (the South Dakota Medical and Osteopathic Practice Act of 1949 providing for unlimited osteopathic licensure is the law whose provisions are quoted as an example), and (5) continued demand for raising and tightening of license qualifications.

Chapter V is devoted to an examination of the organization and operation of state licensing boards and departments. Seventy-five occupations or professions are licensed in one or more states. The osteopathic profession is listed as one of the fourteen fields licensed in all states. The organizational patterns of responsibility in occupational licensing are analyzed and the independent board pattern and the coordinated licensing department system having jurisdiction over all boards are discussed and distinguished. The different provisions and qualifications pertaining to membership on the licensing boards are carefully detailed.

An excellent review of the "Powers and Duties of Occupational Licensing Boards" comprises the sixth chapter. The variation in legal requirements relating to examinations, issuance of licenses, suspension and revocation of licenses, enforcement of laws, approval and supervision of schools, and other similar features of all licensing laws are covered. Their strengths and weaknesses are pointed out.

Chapter VII is devoted to the topic of "Licensing and Occupational Barriers." The varied personal, educational, and experience qualifications of the laws are listed. In regard to experience qualifications, the willingness of the osteopathic profession to voluntarily raise standards is commented upon as follows:

> Twenty-four states require internships of at least one year for doctors of medicine and eighteen states have similar requirements for osteopaths. For professional reasons most doctors of medicine and osteopathy complete internships even in those states which do not require them by law.

In explaining the manner in which licensing qualifications develop, the influences of private associations are recognized. They are explained, in part, by the following reference:

> For example, all states now require applicants for licenses in osteopathy to be graduates of colleges approved by the American Osteopathic Association. By rule of this association, students must have at least two years of pre-professional training before being admitted to these colleges. Therefore, despite the fact that only twenty-seven states directly require this amount of pre-professional work, applicants in all states must meet the rule of the association in order to be eligible for licensure.

The seventh chapter concludes the text portion of the publication and covers "Legislative Considerations." Five elements which legislatures may consider in reaching a balance between maximum public accountability and responsibility, on the one hand, and maximum participation of the profession in preparing standards and enforcing compliance, on the other, are summarized. These five elements could well be within the thinking of any group interested in enacting or revising a licensing law since they are basic matters in the considerations of the legislatures.

The publication is concluded with three appendices and a bibliography. The appendices abstract briefly factual material concerning the various occupations and professions and, in table form, enumerate the various statutory provisions and qualifications of the licensing laws of each state and list the numerical distribution of the groups throughout the country. The bibliography is a valuable compilation of legal articles

and sociological studies of the subject matter of the publication.

On page 73, under Appendix A, the licensing system applicable to the osteopathic profession is abstracted as follows:

All states license osteopaths. In seven states their licenses do not permit them to use drugs or surgery.

General qualifications are a minimum age of 21 and good moral character. All applicants must have graduated from an approved school of osteopathy. This means they must have completed at least two years of college work and four of professional training. Internships are required in California, Colorado, Delaware, New Hampshire, New Jersey, New Mexico, Oregon, South Dakota, Vermont, West Virginia, Wisconsin and Wyoming. Internships are necessary only for the higher level certificate in Arizona, Iowa, Oklahoma, Pennsylvania, Rhode Island and Washington.

Examinations are given by all licensing states. Most states specify the subjects of examination. Application or examination fees are usually $25. Initial license fees of $2.00 to $25.00 are charged in some states. Renewal fees range from $1.00 to $10.00; in Florida, Kansas, Maine, Michigan, Missouri, New Mexico, North Dakota, Ohio, Oklahoma, Tennessee and West Virginia renewal is contingent upon attendance at a one or two-day refresher course. Osteopaths also must pass basic science examinations in Arizona, Arkansas, Colorado, Connecticut, Florida, Iowa, Michigan, Minnesota, Nebraska, Nevada, New Mexico, Oklahoma, Oregon, Rhode Island, South Dakota, Tennessee, Texas, Washington and Wisconsin. Fees vary from $10 to $25.

Licensing boards usually are appointed by the Governor. They may be classified into three groups: medical boards, which do not include any osteopaths—located in Alabama, Illinois, Mississippi and New Hampshire; composite boards, including M.D.'s and D.O.'s and sometimes other practitioners—in Colorado, Delaware, Indiana, Kentucky, Massachusetts, New Jersey, New York, Ohio, Oregon, Rhode Island, South Dakota, Texas, Virginia, Wisconsin and Wyoming; boards composed solely of osteopaths—in the remaining states, except for an ex-officio member in Delaware and Pennsylvania and a lay member in Arizona. Two boards, a higher and a lower, each examine osteopaths in Connecticut, Nebraska and Pennsylvania, the higher board granting permission to perform surgery. The boards have three to fourteen members, appointed for terms from two to six years.

Reciprocity is granted on the basis of equivalent requirements in some states, but some require previous experience.

COMMITTEE ON CHRISTMAS SEALS

STEPHEN M. PUGH, D.O.
Chairman
Everett, Wash.

THE TWENTY-SECOND SEAL CAMPAIGN

The twenty-second osteopathic Christmas seal campaign swings into action this month. Many weeks in the making, it is ready to place in the hands of the profession and public 5,500,000 Christmas seals.

This is a large order. When the seal campaign was started in 1931—for Student Loan only—its object was to spread the word of osteopathy and to raise funds. Now, 21 years later, the campaign purpose remains the same: to spread the word of osteopathy and to raise funds. But its numbers have been many times multiplied. It now distributes 5,500,000 seals and shares its returns with the Osteopathic Research Fund. It has set itself a 1952 goal of $40,000.

How this is to be achieved is told in the plans laid out for this year. They include the campaign among doctors and auxiliary members; a second campaign to reach the public; concurrent campaigns in the colleges and hospitals, and at all Fall conventions of divisional societies. The parents of students are to be asked to contribute. Seal collectors are to come in for attention.

More intensive and more extensive than ever before, the 1952 plans lay particular emphasis on getting contributions from the public. Since the osteopathic public is made up primarily of the patients and friends of osteopathic physicians and their families, the campaign approach to the public must be through these physicians and their families.

That is why the seals are being mailed to the doctors and the Auxiliary members early in October—to allow time for them to order (as directed in the letter with the seals) "Christmas seal packets" to send to patient and Christmas card lists. The success of the public campaign hinges on this participation on the part of the profession and Auxiliary; if participation is assured, success is assured.

The seal packets are well written and well designed. They will reflect credit on the osteopathic profession.

Christmas seal plans for 1952 have been made with courage and imagination. They aim high; they look to the individual doctor and his wife for support, and they anticipate success.

Department of Public Relations

CHESTER D. SWOPE, D.O.
Chairman
Washington, D. C.

TAX RULING ON FEE-SPLITTING

Income Tax Office Decision No. 4096, reported in No. 18 of the *Internal Revenue Bulletin** of September 1, 1952, service ruling No. 13910, reproduced below, is based on the case of Lilly v. Commissioner of Internal Revenue (see JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION 51:404, April 1952).

SECTION 29.23(a)-1: Business expenses. 1952-18-13910
I. T. 4096

INTERNAL REVENUE CODE

Treatment for Federal income tax purposes of payments made by surgeons to other physicians for professional assistance and under fee-splitting arrangements.

Advice is requested relative to the deductibility, for Federal income tax purposes, of payments made by a surgeon for professional assistance in conducting his practice, and of payments made by a surgeon, on a split-fee basis, to other physicians who refer patients to him.

Section 23(a)(1)(A) of the Internal Revenue Code provides that in computing net income there shall be allowed as deductions:

(a) EXPENSES.—
(1) TRADE OR BUSINESS EXPENSES.—
(A) In General.—All the ordinary and necessary expenses paid or incurred during the taxable year in carrying on any trade or business, including a reasonable allowance for salaries or other compensation for personal services actually rendered * * *.

Thus, reasonable compensation for personal services actually rendered which is paid by a surgeon for professional assistance in conducting his practice may be deducted under section 23(a)(1)(A) of the Code as an ordinary and necessary expense of carrying on a trade or business.

Whether reasonable payments made by a surgeon, on a split-fee basis, to other physicians who refer patients to him represent deductible business expenses must be determined in the light of all the circumstances in each case. However, as a general rule, such payments are deductible for Federal income tax purposes provided they are normal, usual, and customary in the profession and in the community; are appropriate and helpful in obtaining business; and do not frustrate sharply defined National or State policies evidenced by a governmental declaration proscribing particular types of conduct. (See Thomas B. Lilly et ux. v. Commissioner, 343 U.S. 90, Ct. D. 1741, I.R.B.1952-8,3.)

*Cautionary Notice: The rulings reported in the *Internal Revenue Bulletin* are for the information of taxpayers and their counsel as showing the trend of official opinion in the administration of the Bureau of Internal Revenue; the rulings other than Treasury Decisions have none of the force or effect of Treasury Decisions and do not commit the Department to any interpretation of the law which has not been formally approved and promulgated by the Secretary of the Treasury.

SPECIAL ARTICLES

Recent Advances in Aviation Medicine*

BRIG. GEN. O. F. McILNAY, USAF (MC)
Washington, D. C.

It is a privilege to come before you and present a few of the problems in aviation physiology with which medical personnel and others connected with military aviation are confronted.

I have been asked to talk on the subject "Recent Advances in Aviation Medicine." It might surprise you if you were told that there have been no recent *advances* in this field. Such a statement would require a bit of explanation for there have been a great many *accomplishments.*

Aviation medicine is a specialty which concerns itself with the selection, maintenance, and improvement of health, safety, and efficiency of flying personnel. During World War I and for many years following, aircraft were sufficiently limited in performance as to make the problems with which flight surgeons were confronted relatively simple ones. We could keep the capabilities, physiologically speaking, ahead of aircraft design. The astonishing advances in aeronautical engineering during the past two decades and particularly since World War II have caused human limitation to be one of the major problems to be solved. Many consider such limitation to be the major problem. Thus, we have not advanced in our ability to keep the capabilities of the human pilots ahead of aircraft design and this explains the seemingly preposterous remark which I made.

We are all aware of the astonishing advances which our aviation engineers and other engineers and scientists have brought about in the capabilities of aircraft of all types, but let us take a brief look at these advances insofar as they can be mentioned without security violation. At the onset of World War I the ceiling of a single-seat airplane was 12,000 feet and the low-powered engines were capable of flights of but 150 to 250 miles. Seventy miles an hour was a good speed. These planes were used as eyes for the artillery and were not fighting machines. They were gradually armed, at first with all kinds of missiles, including objects to be thrown into the propellers of enemy craft, later with cannon and machine guns mounted on the wings, and still later with synchronized guns. But, regardless of importance, one could hardly classify aircraft as a weapon during World War I. Flying was a death-defying game for reckless men who would fly and fight as much for sport as anything else.

The aircraft of World War II bore little resemblance to those of World War I and the problems of aviation medicine had vastly increased. General Spaatz delivered telling blows of first line military importance from aircraft flying at altitudes which required that flight surgeons solve problems, or contribute to the solution of problems, caused by reduced density of the atmosphere. The effects of such reduced density on the crews of aircraft are mechanical and physiologic. The mechanical effects are principally aeroembolism and expansion of internal gases. The principal physiologic effect is known as anoxia, hypoxia, or oxygen-lack. These problems have been partially solved by the pressurization of the interior or part of the interior of aircraft as well as by improvements in oxygen supply systems and masks. The development of the so-called "demand oxygen system into a pressure demand system" alone raised the airman's oxygen ceiling to 43,000 feet and to 50,000 feet under emergency conditions. You realize that today's military aircraft must be designed to fly at even higher altitudes and that a combination of aircraft pressurization and improved pressure oxygen systems must be provided.

We were also confronted with the problem of protection against extreme cold at high altitude, and in high speed and highly maneuverable aircraft there was the problem of G-forces resulting from turns at high speed. The term "G" comes from "gravitation" and exposure to 2-Gs means that exposure is to a pull equal to twice the pull of gravity, having the effect of doubling the weight of the body and all parts thereof. The direction of the application of such force may be *positive,* meaning in the direction of head to buttocks; *negative,* meaning in the direction of buttocks to head, or *transverse.* The effect of such forces is dependent upon the exposure time as well as upon the degree of the force.

All pilots are familiar with the effect of positive G-forces, the effect being that of "blackout" if exposure is sufficient. The average pilot can tolerate 4 to 5 Gs if exposed not over 10 to 15 seconds while flying in sitting position. Ability to tolerate positive Gs has been raised by the use of a so-called G-suit, or more properly anti-G-suit, which automatically puts pressure on certain parts of the body as G forces are built up. Flying in a prone or partially prone position is another means of solution to this problem.

I have mentioned but a few of the problems with which we were confronted during World War II and with which we are still confronted. Their solution then seemed difficult but appears simple in retrospect. The problems of today have been multiplied because of speeds, altitudes, and accelerations which were hardly dreamed of. Talks of flights in the aeropause, by which we mean within the atmosphere but beyond the range within which we can obtain much benefit from it, and even of space flights, is common. No aircraft which is to be flown by a human pilot can be designed without aeromedical research to determine the capabilities of its crew to man such a craft. This research must begin at the time when the craft first becomes an idea to be placed on a drawing board.

Let us look briefly at *some* of the current operational problems which must be considered by those who carry out aeromedical research. They can be divided, primarily, under various headings:

1. Problems of high altitude flight
   a. Oxygen requirements for jet aircraft

*Presented at the General Sessions, Fifty-Sixth Annual Convention of the American Osteopathic Association, Atlantic City, N. J., July 16, 1952.

b. Oxygen equipment for jet aircraft
c. Decompression sickness
d. Cabin pressurization
e. Explosive decompression or sudden accidental loss of cabin pressurization

2. Problems of high speed flight
a. Positive and negative acceleration (length and intensity of exposure)
b. Pilot's pneumatic suit, anti-G, for protection against positive acceleration
c. Cockpit design
d. Flight instruments (numbers, location, readability, etc.)
e. Psychologic limitations
f. Cockpit temperatures
g. Sound problems associated with jet engines

3. Problems concerning flight safety
a. Ejection seat as means of escape
b. Protective helmets
c. Wind-blast protection in leaving high speed aircraft
d. Vision

4. Basic environmental problems relating to man in the aeropause which are largely for solution by the aeronautical engineer
a. Fit and arrangement of crew
b. Visibility from the craft
c. Time-distance problem
d. Temperatures
e. Pressure environment
f. Acceleration
g. Noise and vibration
h. Radiation problems
i. Meteorite collision
j. Escape problems
k. Combined stresses
l. The importance of weight.

You can readily see that aviation medicine must consist of clinical medicine, physiology, psychology, physics, biochemistry, and all of the allied sciences, plus electrical, chemical, mechanical, and textile engineering. The knowledge and skill of the leading scientific minds in almost all fields must be put to use.

We will have time for further consideration of a few of these problems and the solutions to date. The first problem was that of oxygen requirement and oxygen equipment for pilots of jet aircraft at high altitude. You know that absorption of oxygen within the lungs is dependent upon the partial pressure of oxygen. Thus, absorption decreases with altitude, which causes a decrease in pressure, unless the partial pressure of oxygen is increased by raising the percentage of oxygen in the air taken into the lungs. Oxygen addition is necessary to maintain efficiency in prolonged flight above 10,000 feet. Increase in altitude increases the need so that at 18,000 feet the average pilot is dangerously incapacitated. You will remember that the first and simplest oxygen system used a rubber hose with a pipe stem for introducing oxygen into the mouth when required. High percentage of oxygen could not be obtained by this means and a mask was introduced to replace the pipe stem. The early mask provided a continuous flow of pure oxygen when desired. Such continuous flow was wasteful in that it did not provide for any rebreathing of oxygen, and it also provided oxygen in higher concentration than required. The BLB mask of the Mayo Clinic was adopted in 1938 and this was a step toward oxygen economy and efficiency at high altitude. The principle was that a bag or bellows stored the continuously flowing oxygen during exhalation and released it during inhalation. This system was very vulnerable to freezing and the cold temperatures encountered in some of the positions in our bombers during World War II forced the continuous-flow system to be replaced by a demand system, a development which was put into use in the spring of 1943.

The demand system supplies oxygen in the amount demanded and only during inhalation. The regulator will supply nearly pure air below 5,000 feet and progressively increases the oxygen with altitude until almost pure oxygen is supplied at 33,000 feet. The advantages of this system were resistance to freezing, economy of oxygen, and oxygen supplied in quantity demanded.

The more recent development is the pressure demand system which applies positive pressure of from 6 to 8 inches of water pressure. Without positive pressure a ceiling is reached at about 40,000 feet above which the effective partial oxygen pressure is below required level even when pure oxygen is provided. The positive pressure of the pressure demand system raises the pilot's altitude ceiling several thousand feet without other additional equipment and will enable him to survive at 50,000 for short periods in emergencies, such as, for example, if the pressurization of the aircraft is lost. It is by means of a combination of pressurized aircraft, pressure demand oxygen system, and pressurized suits that we can now send pilots to altitudes never before reached.

At this point I want to call attention to an Associated Press dispatch dated July 15. Having the information contained therein appear in the newspapers makes it possible for me to refer to certain developments which are pertinent to my subject, but which security regulations would have made it impossible for me to discuss previously. The dispatch revealed that a Navy Skyrocket had reached a new record altitude of 79,000 feet and a speed of more than 1,300 miles an hour. In order to fly at that speed the Skyrocket is reported to have carried enough refrigeration equipment to cool a theater of 3,000 seats "in order to keep the pilot from being roasted alive and to keep the airplane metal from softening."

I made brief mention of the G-suit to be worn by fighter pilots to enable them to withstand greater G-forces without "grayout" or "blackout." The newer type of G-suit is similar in appearance to a lightweight summer flight suit. Rubber bladders, which are pressurized automatically, with the build-up of accelerative forces, through an intricate valve system, apply pressure over the abdomen, thigh, calf, and buttocks when required. These suits will afford about 3-G protection and thus enable most pilots to withstand short periods of up to about 8-G without blackout. This is positive G. There have been many G suits, some of which are almost laughable in retrospect, but which actually represented remarkable ideas at one time.

It is easily seen that I have had to choose between a rather general discussion of the lines along which aviation medicine has progressed and a more detailed presentation of progress in certain phases. I have not been engaged in aeromedical research and do not consider myself fully qualified to make a detailed presentation of many of the phases of aviation physiology. Days could be occupied by such presentation.

Perhaps many of you are well acquainted with the problems and direction of solutions to those problems which I have been able to discuss during a very limited period of time.

In closing, I feel that some mention should be made of the air evacuation service which, as you know, has enabled the military services to return battle casualties from Korea to the United States, and often to the vicinities of their homes, within a period of but a few days following their injuries. This service insures that the best possible definitive care can be given. The development of this service has been largely due to the foresight of those concerned with aviation medicine although it could not have been accomplished without the enthusiastic support of many nonmedical personnel.

Civil Defense—Health and Special Weapons Defense Services*

NORVIN C. KIEFER, M.D., M.P.H.

Director, Health and Special Weapons Defense Division

Federal Civil Defense Administration

Washington, D. C.

May I first express the appreciation of the Federal Civil Defense Administration for the interest and cooperation of the American Osteopathic Association in the nationwide Civil Defense program? It is a privilege to be here with you to discuss our progress and problems.

Today I would like to discuss with you first, the need for a good Civil Defense program in the United States; second, the types of attack which an enemy might make on this country; and third, the problems which the health professions face and must solve.

First then, let us consider the need for a Civil Defense program in the United States. About 2 years ago there appeared in the official Federal publication "United States Civil Defense"[1] the following considered statement: "The Civil Defense Program for this Country must be in constant readiness because for the first time in 136 years an enemy has the power to attack our cities in strong force, and for the first time in our history that attack may come suddenly, with little or no warning."

Over a year ago, the President of the United States[2] warned, "Remember this. If we do have another war, it will be an atomic war. We could expect many atomic bombs to be dropped on American cities. And a single one of them could cause many times more casualties than we have suffered in all the fighting in Korea."

General George C. Marshall,[3] while Secretary of Defense, told the Congress of the United States that Civil Defense was "an urgent, military necessity." General Omar Bradley,[4] Chairman of the Joint Chiefs of Staff, expressed a similar belief when he said, "We must have . . . an organization in being, placed and staffed beforehand to take over in the event of such an emergency. If Civil Defense does not function effectively, our defense efforts will be very adversely affected."

No city in continental United States has ever been subjected to an enemy air attack. Many Americans are vaguely aware that such attacks could occur in a war of the future; many of those Americans who saw military service during World War II had the unpleasant opportunity of observing at first hand the furious effects of enemy air attack on civilian populations of other countries. Most Americans are reasonably aware of the almost incredible increase in destructive power which the atomic bomb has given to the airplane.

But this knowledge, this recognition of potential danger usually is not correlated in such a way as to lead to full realization of the realness of our peril. Even less has it resulted in tangible, positive, wholehearted effort, on the part of individual citizens to build a strong Civil Defense machine.

There are many reasons for this. One is, of course, the eternal hope of America that lasting peace can be achieved without another bloody, international catastrophe. As members of the health profession, I am sure that all of us here today fervently hope and pray that lasting goodwill among men may be ultimately achieved without further slaughter and destruction.

A second reason, however, contains less nobility and even less recognition of cold, technical facts. This is the belief that successful enemy attack on American cities just could not happen. There probably are three hypothetical bases for such a belief. First, is the belief that geographical distances alone are an effective barrier against any enemy attack. Examination of a map, particularly of a globe such as you may have in your library, coupled with recognition of the flight range of modern planes, should quickly dispel this belief and label it as being utterly preposterous. Let us have no Maginot Line of alleged barriers of geographical distances when we are considering air attack.

The second mistaken concept is that the Russians are not logistically capable of mounting a serious attack on the civilian population of this country. Recently, General Nathan Twining,[5] Acting Chief of Staff of the United States Air Force, told our nation's state Civil Defense directors: "Our intelligence people estimate that the Russians can launch today more than 400 TU-4's (B-29 type long-range heavy bombers) carrying enough atom and conventional-type bombs to hit all of our major, metropolitan industrial areas." Do you think that this statement should lead to any complacency concerning enemy capabilities?

A third incorrect belief is that even if the enemy has the planes, the pilots, and the bombs to attack any part of this country, our own air defenses are so strong that attempted enemy attacks would be almost totally unsuccessful, if not downright suicidal. In answer to this bit of wishful thinking, let me remind you that General Hoyt S. Vandenberg,[6] Chief of Staff of the United States Air Force, has warned that even after our air defenses have been greatly improved, we could not hope to stop more than 30

*Presented at the General Sessions, Fifty-Sixth Annual Convention of the American Osteopathic Association, July 16, 1952.

per cent of attacking enemy planes. In other words, 70 per cent would get through.

I have mentioned only the probable success of enemy air attack on this country. Do not forget the additional possibilities of attack from the sea, particularly from submarine-launched guided missiles and related projectiles, of widespread sabotage and other covert acts, and of other forms of warfare.

Let us turn now to a consideration of the various types of weapons which might be used against civilians. There are several:

1. *High Explosive and Incendiary Bombs.*—The awful destructive power of the atomic bomb has, at least at times, led us to forget the immense destruction caused, during World War II, and more recently in Korea, by these older weapons. The term "older" is used advisedly, because great improvements—if they should be called improvements—have been made in them. Let us not forget that back in 1945 incendiary bombs caused about 80,000 deaths in Tokyo in one day. It must be expected that in a future war our cities would be attacked with these weapons, used alone or in combination with other methods of warfare.

2. *The Atomic Bomb.*—One method of expressing the explosive power of this bomb is to compare it to the well-known TNT. The first bomb used against a city, the one used against Hiroshima almost 7 years ago, had the fantastic explosive equivalent of 20,000 tons of TNT. That represents the same explosive power as 40,000,000 pounds of TNT.

I want to make it clear at this point that it is this enormous and unprecedented explosive force which makes the atomic bomb such a terrible threat to metropolitan civilian populations. As physicians, you probably are interested most in the bizarre injuries, such as radiation sickness and flash burns, as well as the more familiar mechanical and related injuries, that the atomic bomb produces. But do not forget that the real challenge that the atomic bomb presents to the health professions is not primarily the types of injuries that it can produce but rather the fact that here is a weapon that is capable of producing, within a few seconds, tens or even hundreds of thousands of living and dead casualties. Remember, this is not supposition. It is a fact established in shattering terms in each of two Japanese cities nearly 7 years ago. No matter how staggering these enormous casualty figures may seem when viewed in the light of ordinary peacetime civilian casualty care, they are factual and therefore must be the starting point, the basis for Civil Defense casualty care planning.

3. *Biological Warfare.*—This type of attack, which Rosebury[7] has called "bacteriology upside-down," could be used against people, animals, or crops. Against humans, mass attack by biological weapons is possible by employing aerial or submarine-launched bombs or projectiles, aerosol sprays, and even gross contamination of water supplies. Limited attack against key human objectives could be accomplished by contamination of food, water, and ventilating systems. Practically any infectious disease agent could be used. The chief qualifications of an effective biological weapon would seem to be: a high infectivity rate; low natural or acquired resistance of most of the attacked population; either a high fatality or high morbidity rate among those infected; stability of the organisms; and adaptability of the organism to mass production and distribution. Not only exotic diseases such as plague and cholera could be used effectively but certain diseases already existing in this country—psittacosis, Q fever, tularemia, brucellosis, typhus, and many others—could also be devastatingly employed.

The farms as well as the factories of America have played a major role in deciding the outcome of the first two World Wars. Biological warfare against our animals is perhaps an even greater threat than biological warfare against people. Theoretically, at least, artificially-induced epizootics would spread more rapidly and would be more difficult to control than epidemics among humans.

An uncontrolled outbreak of foot-and-mouth disease, for example, might reduce essential animal products by as much as one-fourth.[8] Rinderpest, fowl plague, Newcastle disease, anthrax, and hog cholera variants are examples of other devastating animal and poultry diseases which conceivably could be intentionally introduced. Do not forget that successful attacks on our animals not only would seriously reduce our meat and dairy food production but, in addition, would decrease or even cripple our production of such indispensable items as wool, leather, and hides, and certain life-saving medicinal products.

Still another form of biological warfare could be the intentional introduction of rusts, fungi, growth regulators, and related substances that might result in devastation of our crops. The consequences to our food supplies, our food animal production, and our industrial production could easily lose a war of the future for us.

4. *Poison Gases.*—Currently, our Civil Defense plans are based almost entirely on protection of the civilian population of this country against one general type of these gases: nerve gas. Nerve gases comprise a chemical group that has as its chief effect on the human body inhibition of the enzyme cholinesterase. This action in turn results in loss of normal body destruction of acetylcholine. Consequently, unsuppressed acetylcholine overstimulation of parasympathetic nerve endings produces bronchoconstriction, rhinorrhea, photophobia, ciliary contraction, involuntary muscle contractions, convulsions, vasomotor collapse, and cardiac arrest. Nerve gases are colorless and odorless. Generally they are heavier than air and are nonpersistent. A saturation type of aerial attack with nerve gas bombs conceivably could result in casualties comparable in number to those produced by the atomic bomb.

These, then, with the addition of psychological warfare, are the potential weapons that might be used against our civilians by enemy attack. The current plans of the Federal Civil Defense Administration are based on the possible occurrence of 7,500,000 living and dead civilian casualties of enemy attack on the United States. This is not a pretty picture. But it must *never* be allowed to lead to an attitude of despair and defeatism.

We must learn to strike a proper balance between realism and optimism. I hope that I have impressed you with the idea that to deny, discount, or even minimize the potential threat and destructiveness of enemy attack on this country is to turn one's back on reality and to live in a fool's paradise. There is another, considerably different attitude, however, which might in the long run be more damaging to our national security. I refer to the opinion, which

I have been distressed to hear expressed on many occasions, that defense against the weapons I have described is so extremely difficult, if not impossible, that there isn't any use in trying to do anything about it. This great country was built by people who found ways to conquer their most discouraging problems. I believe that it still consists of that kind of people.

To be certain, this is an extremely tough job, but it is not an impossible one. It requires tough people, determined, far-seeing people, with belief in the future of America, to do the job. On April 24 of this year the President of the United States[9] said, "Everyone in this country—all of us—must face the fact that Civil Defense is, and will continue to be, just as vital to American security as our armed forces, our defense production, and our aid to allies and friends abroad. Civil Defense is another indispensable part of our total security program. I really believe that anyone who reflects upon this matter will understand why that is so. Every weakness in Civil Defense increases an aggressor's temptation to attack us. Every weakness in Civil Defense adds to the strength of a potential enemy's stockpile of atomic bombs."

Let us consider then some of the things that are being done and must be done to furnish the nation with Civil Defense Health and Special Weapons Defense Services. Let me make clear at the outset my firm belief that the real strength of national Civil Defense is the local Civil Defense organizations. If they are strong, national Civil Defense will be strong. If they are weak, there can be no adequate Civil Defense. Organization of and training for Civil Defense Health and Special Weapons Defense must start in the community.

To members of the health professions technical training has the most appeal. Remember my previous statement, however, that the real problem produced by the atomic bomb is the numbers rather than the types of casualties. In the face of the huge numbers of casualties which could be expected from successful atomic bombing, training for a war disaster organization must receive priority over technical training. We are forced to plan in terms of tens of thousands of casualties, produced within seconds, perhaps simultaneously in many areas. As in all traumatic surgery, lost minutes can be measured in lost lives. Therefore, the first-aid and hospital systems of the attacked and nearby communities would have to be mobilized within minutes. Furthermore, mobile support also would have to be instantaneously mobilized from cities hundreds or even a thousand miles distant.

No matter what time of the day attack occurred, every member of the health services would have to know where to report immediately, what his exact duties would be, where and what his supplies would be, and so on. This sort of mobilization and organization demands the most careful, thorough, detailed, operating plans, accompanied by numerous full-scale drills and test exercises. An organization on paper may be interesting to look at, but it won't save any lives unless that paper organization can be brought to life, into real and practiced being, instantaneously after enemy attack.

I believe you will be interested in a report of the current status of the Civil Defense Health and Special Weapons Defense supply program. It represents tangible evidence of real support for Civil Defense health services across the nation.

In fiscal years 1951 and 1952, the Congress of the United States appropriated a total of $70,000,000 for Federal procurement of medical supplies or for matching State funds for procurement of medical supplies. The States were urged to procure the initial supplies to carry them through the first few hours of casualty care after enemy attack. I am glad to report that the States now have on order the initial supplies for over 6,500 first aid stations. This optimistic report must be tempered, however, by the fact that because State appropriations allowed only varying degrees of participation in our Federal matching program, the nation-wide distribution of these first aid stations is correspondingly variable.

Federal warehouses of health supplies are to back up local and State supplies. They, therefore, are being located within a few hours shipping distance of target areas and will be available for use anywhere that they are needed.

The Federal Civil Defense Administration now has on order, for storage in Federal warehouses, the following items. I want to repeat that these items are now on order. Some of them are already being delivered. Others, because of the large volumes entailed, will understandably require a few to many months for completion of total deliveries. Here then are the items which I can tell you now will be available in Federal warehouses, for Civil Defense purposes, just as rapidly as our manufacturers can turn them out:

1. Surgical supplies for the first week of emergency care for 2,000,000 surviving casualties (These supplies are, with a few revisions, those listed in our publication "Health Services and Special Weapons Defense."[10] This is, of course, an austerity list. Originally it was prepared for us by the Department of Defense and was based on a detailed analysis and interpretation of long military experience in mass casualty care.)
2. 2,060,000 each of blood donor sets, recipient sets, and collecting bottles, and a corresponding amount of units of grouping and RH typing serums and blood shipping containers
3. 1,250,000 paper blankets
4. Substantial quantities of antibiotics: 7,500,000 capsules each of aureomycin, terramycin, and chloramphenicol; over 1,500,000 intravenous doses of aureomycin and terramycin; 150,000 doses of streptomycin; and 5,000,000 1 cc. doses (400,000 units per 1 cc.) of penicillin in oil, and 250,000 doses (1,000,000 units per dose) of crystalline penicillin
5. 750,000 units of blood plasma
6. 1,200,000 units of PVP (polyvinyl pyrollidon) and 300,000 units of dextran
7. 25,000,000 doses of smallpox vaccine and 50,000 bottles (20,000 units per bottle) of tetanus antitoxin
8. 1,000 radiological survey meters
9. 187,500 folding canvas cots
10. Small amounts of a few miscellaneous items.

With few exceptions, all of the Federal and State orders were placed through the Armed Services Medical Procurement Agency. Thus the entire procurement program for medical and surgical supplies for national defense—both military and civil—are be-

ing integrated, phased, and assigned appropriate priorities by one agency. Moreover, this agency is one with competence, staff, and experience to do the job.

I believe you will be interested in some further information on the two plasma expanders which we are stocking. The first, dextran, is a complex macromolecular polysaccharide. Several hundred thousand units of this substance have been used in Sweden, with quite satisfactory results, and it has been used satisfactorily in the United States. Although this preparation is now fully approved by the Food and Drug Administration, production in this country unfortunately is sharply limited at the present time.

Polyvinyl pyrollidon, commonly called PVP, was developed in Germany during World War II. Thus far, it has been approved by the Food and Drug Administration for only military and Federal Civil Defense war reserves. The production capacity for this preparation is quite large.

Both PVP and dextran are highly effective life-saving substances in shock from burns or mechanical injuries. They are so effective that it is believed that they are adequate temporary substitutes for blood plasma in the first 12 to 18 hours following injury. Beyond this time, plasma is distinctly more effective in many cases.

I want to emphasize the fact that the availability of these substances in no way decreases our need for blood donations for plasma. Furthermore, I am sure that you realize that none of these substances, including plasma, can in any way be regarded as an adequate replacement for whole blood. Therefore, no matter what the availability of plasma and plasma expanders may eventually be, our nation-wide blood procurement program must be so organized as to make possible immediately following a disaster the collection of huge amounts of whole blood, particularly group O blood in the early post-attack hours. The technical details of the Civil Defense blood program are set forth in our recent manual "Blood and Blood Derivatives Program."[11]

We have estimated that approximately 60 per cent of atomic bomb casualties will be burned. The management of burns, therefore, is a subject of particular interest to Civil Defense health services. The National Research Council has supported our recommendation that for Civil Defense purposes dry dressings should be used in the first aid management of burns. No ointments or other topical medications should be used by the first aid workers for the surface treatment of cutaneous burns in Civil Defense casualty management.

For professional workers, we recommend initial use of a new type of burn pad which we have ordered in large quantities. This is a thick dressing which comes in two sizes: 22 by 36 and 22 by 18 inches. It consists of a half-inch layer of cotton backed by fifteen layers of cellulose and two to six additional layers of water-repellent cellulose. The face is an extremely fine, dry, white, surgical gauze. The back is water-repellent but not water-impervious maslin. This dressing has proved to be so useful for so many injuries in the United States Army experience in Korea that it is now known to the Army as a "universal protective dressing."

A discussion of various types of treatment of burns, as well as the treatment of various types of wounds, wound shock, fractures, acute radiation syndrome, and a discussion of blood transfusion, is included in a forthcoming manual of the Federal Civil Defense Administration. It is entitled "Emergency Treatment in Major Disasters"[12] and was prepared for us by the Division of Medical Sciences of the National Research Council.

While we are on the subject of publications, let me mention a few of the most recent Federal Civil Defense Administration publications which should be of particular interest to you as physicians. There is a manual[13] which describes in detail standard casualty record forms and recommends nation-wide use of these standard forms. There is an information bulletin[14] describing the burn pads which I just mentioned, and another[15] containing the recommendations of an Ad Hoc Committee of the National Research Council relating to the types of antibiotics to be used in Civil Defense. A discussion of permissible doses of radiation, for Civil Defense emergency purposes, appeared in one of our technical bulletins.[16] A manual on the nurse in Civil Defense[17] has just come off the press. The final manuscript of a new manual on the organization and operation of Civil Defense first-aid systems[18] has just been completed. Other manuals on the medical aspects of atomic bombs, radiation detection and monitoring, the organization and operation of Civil Defense hospital services, the dentist in Civil Defense, emergency water sanitation services, emergency food and milk sanitation services, biological warfare defense, chemical warfare defense, mortuary services, and others are all in process of preparation. Preparation of all this material is a huge, difficult, and time-consuming task for a relatively small staff. I can promise you that they will be completed as rapidly as it is humanly possible to do so, but each must represent the broadest possible nation-wide consensus of recognized technical authorities, and some will be delayed pending the outcome of technical studies.

I recognize that I have covered this vast field of Civil Defense Health and Special Weapons Defense Services in an extremely sketchy manner, and I am certain that I have completely omitted discussion of some aspects in which some of you are greatly interested. I am sure that you must recognize that to describe all of the various essential services adequately to you would require many days of lectures. I recommend that you read the various publications, relating to Health and Special Weapons Defense, which have been and will be published by your Federal, State, and local Civil Defense Agencies. I urge that various aspects of Civil Defense Health and Special Weapons Defense continue to occupy an important role in the programs of your national, State, and county osteopathic associations. Above all, I ask you to enroll in and become active parts of your official Civil Defense organizations. When I say "you" I am including this entire audience because this is not only an obligation of the physicians who are here today. The wives and other guests of the American Osteopathic Association members also are needed as nurses aides, first aid workers, home nurses, improvised hospital housekeeping personnel, laboratory aides, sanitation aides, and for other essential duties in the Health and Special Weapons Defense field, not to mention a multitude of other duties in the total Civil Defense program in which millions of volunteer workers are needed.

Unfortunately, there is no easy way to establish

a good Civil Defense program. It will take hard work, devotion to a cause, and heavy sacrifices of your time. But if you are unwilling to participate to the utmost, you must be reconciled to consequences of not having a good Civil Defense organization in your community. Either we are to be prepared or we aren't. It's as simple as that. Take your choice. As citizens, you—every one of you—are the ones who must decide. Your official Civil Defense agency needs your support and help—*now!*

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Civil Air Patrol and Civil Defense*

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I would like to trace for a few moments the history of air power, going back to its very earliest days. I think that is quite appropriate on this occasion, because right here in Atlantic City now living retired is Major General B. D. Foulois who was one of the earliest flyers. After the Wright brothers had made their flight and the War Department had reluctantly decided to purchase an airplane, Foulois, Frank P. Lahm, and Frederic E. Humphreys, an engineer, were the three first army men to start flying.

The specifications for that first plane, interestingly enough, called for the ability to be hauled on an escort wagon. An escort wagon, which could be drawn by two mules, thus became the first aircraft carrier.

By 1910 the Army Air Force, called Aviation Section of the Signal Corps at that time, had dwindled to one pilot, Foulois, one airplane, and a few enlisted men. In 1911 this formidable force was joined by Hap Arnold and Tommy Milling. In 1915 when I joined up with the outfit I think they had a total of about twenty or thirty aviators in the Army Air Force, still the Aviation Section of the Signal Corps. This force did some operation down in Mexico—not too successful because of the limitations of the planes at that time. It built up rather rapidly in World War I when we were going to flood the skies over Europe with American-made airplanes. Unfortunately our people forgot that appropriating money does not produce airplanes; it takes time as well.

By the end of World War I there were very few American airplanes being flown over the front. Practically all of our flying was in French-built and British-built planes. After World War I the peace advocates took over. There were going to be no more wars and the military air forces, as well as the other military establishments, dwindled to almost nothing and struggled along on starvation wages until Hitler began to cause trouble.

Sometime after he started his moves and while we were not yet in the war, we began to realize again that we needed air power, air forces. And so we started building up again. Eventually, and fortunately for us, we were finally able to get all of our vast resources which go to make air power into play, and in World War II air power did have a final and overwhelming determining effect on its outcome.

To illustrate how badly off we were at the outset of World War II, our military forces, and that includes both Army and Navy, were inadequate to provide even the submarine patrol—antisubmarine patrol—off our coast. The planes we had were necessary for other military purposes, and they were very few at that. This shortage of aircraft and the pilots to fly them resulted in the use of the civilian planes, small planes inadequate for the purpose, but bravely flown by Civil Air Patrol over our waters, well out to sea on antisubmarine work. This was the beginning of the Civil Air Patrol in World War II.

Now air power has made tremendous strides since its early days—and they are not too far in the past—because military aviation, as I say, started in 1908 and this is 1952. But during this period the progress of science and many other related things has been rapid. While this development has been beneficial to the world in some ways, in other ways it has produced many problems. Progress and science have made aircraft very different from that plane that had to be hauled around on an escort wagon. Airplanes now can move freely over the earth's surface, for tremendous distances and carrying tremendous weights.

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Those who have been connected with the air force in wars and have seen the result of the air attacks on nations unable to defend themselves fully realize what a horrible power we have in our hands. The destruction which I saw in Germany and later in Japan was terrible. It made me shudder to see the effects, not only the death and injury of the people and the destruction of property, but the impact on the mentality of the people concerned. A nation under air attack that is not adequately prepared to defend itself not only loses lives and property, but is, I believe, in danger of losing its own soul. That almost happened during World War II and will almost certainly happen during another world war, the effect is so terrific.

Now air power is not just military airplanes and military personnel; it is many things. It is a great industrial capacity which means the ability to build airplanes and the weapons they carry. It is a great civil air fleet, a commercial fleet, carrying passengers and freight and express all over the United States and to the far corners of the world. It is a group of people who are air minded, who realize the importance of air power and are willing to do their part in obtaining it. It means succeeding generations of young men who want to fly, who are imbued with the idea of the air, just as in the early days of Britain and some of the Mediterranean countries their people were interested in the sea and the nations became great sea powers. Now no nation will be great or remain great that has not fully developed its air power. Air power is the predominating force in the world today, and we must realize that.

Now the Civil Air Patrol since World War II has expanded its activities. The people conducting its policies felt that air power was such a vital thing that they had to move into it on a much larger scale than they did in World War II. At the present time its activities are primarily fourfold.

First, Civil Air Patrol has under its control some 8,000 or 9,000 amateur radio stations—most of them mobile—that can be used in time of emergency in a national hookup to meet whatever situation might arise.

Second, it uses airplanes on search and rescue. About 80 or 90 per cent of the searching for airplanes that are forced down in the mountains or other places is done by Civil Air Patrol.

Third, it has a cadet program. At present we have 50,000 cadets in it and we hope to get more. They are taken at the high-school age, 14 or 15, and given a 3 or 4 year course of indoctrination in air power and the airplane and what it means. They form a potential base for our aviators of the future. Air power only lives by having youth come into it. An air force that depends on the old men of World War II will rapidly wither and die. We have got to get young men into it, and that is a very, very important part of the Civil Air Patrol's activities. As a part of that cadet activity we annually send quite a few of our carefully selected cadets to foreign countries; they in turn send boys over here. This is a great factor in establishing good international relationships. I believe that this year we are exchanging cadets with Canada, Mexico, Brazil, and eleven countries in Europe of the NATO organization.

Civil Air Patrol's concern with civil defense, its fourth principal activity, ties in very closely with the Civil Defense program. We have formed what we call mobile support units. There are over 400 of these throughout the United States. These mobile support units are a combination of air and ground resources. Privately owned airplanes are available to units as are ambulances, fire trucks, medical supplies, and all the things necessary for relieving an area in distress. They are made available to the Civil Defense organization. They are used from time to time in the disasters that occur even during peaceful days, such as the big explosion in Texas City some years ago. These units or parts of them were used during the blizzards in the west a year or 2 ago, and in the Mississippi and Missouri flood last year. That is all an important part of Civil Air Patrol's work.

Civil Air Patrol is a volunteer organization; nobody gets paid for working. The only reward you get is the satisfaction that you are doing something for your country. But strange as that may seem that appears to be an adequate reward for a lot of fine outstanding citizens. I think we need a whole lot more of that type of volunteer effort to put across our Civil Defense program in this air age.

And as for Civil Defense, I agree with what has been said by the previous speaker—without Civil Defense we are helpless. No matter how strong our military air forces are, if we have not built up the capacity to resist enemy attacks in our own country, those air forces will not long operate, because when manufacturing capacity breaks down, when the will to resist and the morale of the people at home weaken, when training establishments and all that goes with them are disrupted, the military forces in the field disintegrate rapidly. So no nation is stronger in air power than it is in all of its components, and among them Civil Defense is vitally important.

The question of organizing Civil Defense against air attack is a very complicated one, but there are many things that can be done. In spite of the great destructive force of atomic weapons there are ways of meeting it. If you are exposed you have not met it; you must get yourself under some kind of cover or shelter to escape the blast. But there are ways of meeting it; it is not a hopeless situation at all. Proper preparation on our part can place the American people in position to withstand any air attacks that can be delivered against them.

THE TREATMENT OF STRABISMUS IN CHILDHOOD—ATTEBERY

(Continued from page 116.)

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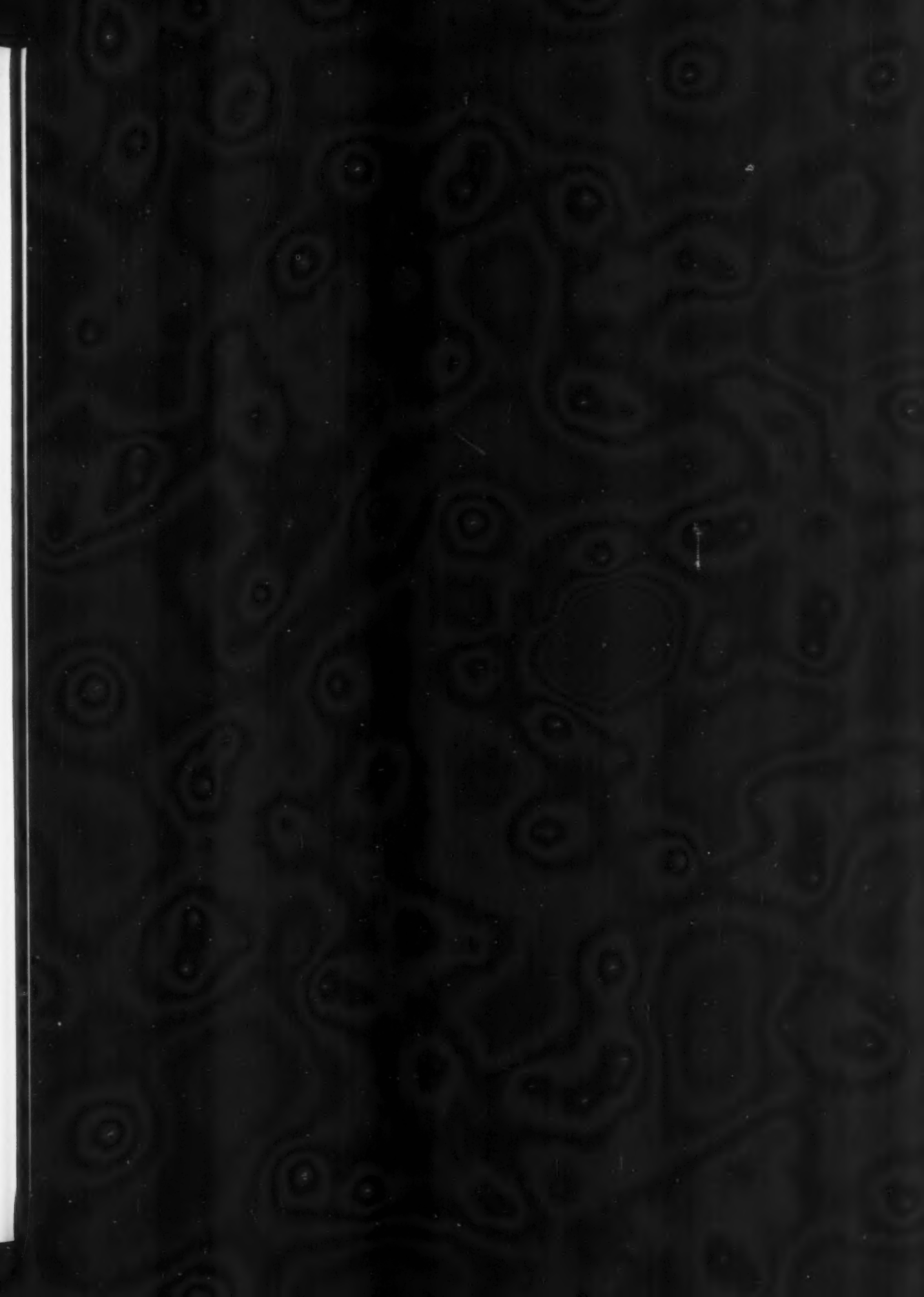
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